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(71) Applicant: THE PATENT AND LICENSE EXCHANGE, INC. [US/US]; Suite 300, 225 South Lake Avenue, Pasadena, CA 91101 (US).

(72) Inventors: KOSSOVSKY, Nir; 460 California Terrace, Pasadena, CA 91101 (US). BRANDEGEE, Bear; 460 California Terrace, Pasadena, CA 91105 (US). ARROW, Alexander, K.; 171 Church Lane, #14, Los Angeles, CA 90049 (US). JOHNSON, Robert, M.; 808 Montrose Avenue, South Pasadena, CA 91030 (US).

(74) Agents: MORINO, Fabio, E. et al.; Skjerven, Morrill, MacPherson, Franklin & Friel LLP, Suite 700, 25 Metro Drive, San Jose, CA 95110 (US).

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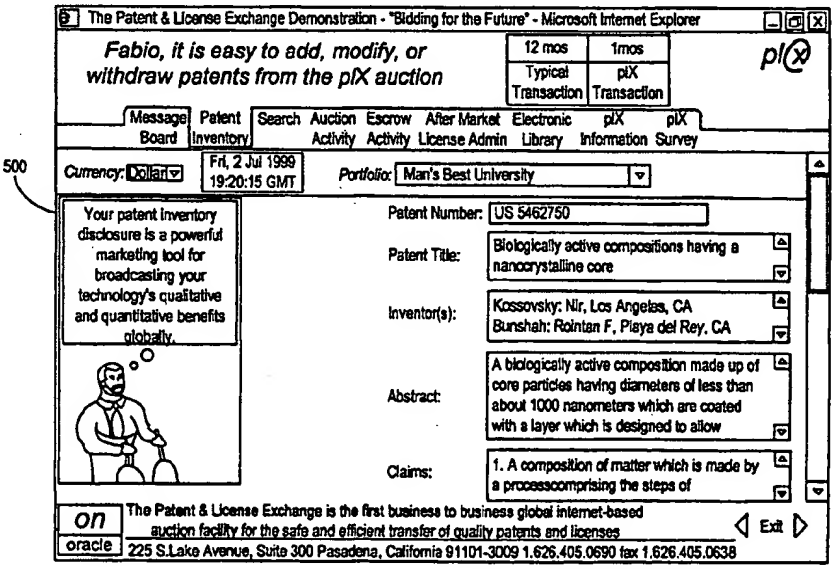

(57) Abstract

An online patent and license exchange is provided which enables potential licensors and licensees of patents and other intellectual property rights to efficiently and reliably transact IP license or assignment agreements. Three markets are part of the exchange: a license market, an option market and a securitized asset cash flows market. The online patent and license exchange comprises a comprehensive database of IP rights offered for licensing on the exchange, including a reliable market value estimation of the price of each IP asset listed on the exchange, a transaction closing service, a patent insurance service and an escrow service.

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ONLINE PATENT AND LICENSE EXCHANGE

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims priority from provisional patent application Ser. No. 60/124,847, filed on March 17, 1999, now pending, which is incorporated herein by reference in its entirety..

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates generally to electronic commerce and, more particularly, to electronic commerce of intellectual property rights.

Related Art

Effective licensing of intellectual property (IP) rights and, in particular, patent rights, presents unique challenges due to the complexity of the laws regulating the acquisition and enforcement of IP rights on the one hand and the intricacies of evaluating the potential values of the emerging technologies sought to be protected by the IP rights on the other. Patent rights, for example, require formal application and evaluation proceedings (patent prosecution) in the United States patent and Trademark Office that may last for several years. Under current laws, a patent grants its owner a limited monopoly in the patented invention starting on the date the patent is granted for a term of 20 years from the filing date of the patent application. Thus, the effective patent term may be

significantly shorter than the 20 year term set by the statute.

Furthermore, inventors are often not interested or not able to exploit patented technologies on their own, but rather prefer to license their rights to third parties for commercial development. However, patents often issue before a market has been established for the technology protected by the patents, making the process for establishing reasonable terms for patent licensing rather complicated. In the prior art, the process of licensing patent rights requires, on average, a significant portion of the patent term, thereby limiting the amount of revenue generated by patent rights. According to one study, the patent licensing process requires, on average, 37 months. Since patent prosecution requires on average 2-3 years, between a quarter and third of the statutory patent term may be lost for licensing purposes under current patent licensing practices.

Several factors contribute to the inefficiency of current patent licensing practices including, but not limited to, the difficulty of matching inventors and other potential patent licensors with interested and qualified potential patent licensees, the intricacies of determining an accurate market value for the patented technology and the lack of an efficient infrastructure for the secure transfer of intellectual property rights.

There is thus a need for a more efficient and reliable system for licensing patent and other intellectual property rights.

SUMMARY OF THE INVENTION

The method and apparatus of the present invention provide an online patent and license exchange which enables potential licensors and licensees of patents and other intellectual property rights to efficiently and reliably transact IP license or assignment agreements. Three markets are part of the exchange: a license market, an options market and a securitized asset cash flows market. The online patent and license exchange comprises a comprehensive database of IP rights offered for licensing on the exchange, including a reliable market value estimation of the price of each IP asset listed on the exchange, a transaction closing service, a patent insurance service and an escrow service.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of a computer system in accordance to an embodiment of the invention.

Fig. 2A is a block diagram of the hardware/software structure of the client computers of Fig. 1.

Fig. 2B is a block diagram of the hardware/software structure of the server computer of Fig. 1.

Fig. 3 is a flow diagram of an exchange operation of the server program of Fig. 2B.

Fig. 4 is a flow diagram of an auction operation of the server program of Fig. 2B.

Fig. 5 illustrates a patent information page displayed by the web browser of Fig. 2A on screen of a client computer during operation of the computer system of Fig. 1.

Fig. 6 illustrates a search menu page displayed by the web browser of Fig. 2A on screen of a client computer during operation of the computer system of Fig. 1.

Figs. 7A and 7B illustrate a search page displayed by the web browser of Fig. 2A on screen of a client computer during operation of the computer system of Fig. 1.

Fig. 8 illustrates a search results page displayed by the web browser of Fig. 2A on screen of a client computer during operation of the computer system of Fig. 1.

Fig. 9 illustrates a results information page displayed by the web browser of Fig. 2A on screen of a client computer during operation of the computer system of Fig. 1.

Fig. 10 illustrates a bid page displayed by the web browser of Fig. 2A on screen of a client computer during operation of the computer system of Fig. 1.

Fig. 11 illustrates an auction status page displayed by the web browser of Fig. 2A on screen of a client computer during operation of the computer system of Fig. 1.

Fig. 12 illustrates a bid details page displayed by the web browser of Fig. 2A on screen of a client computer during operation of the computer system of Fig. 1.

Fig. 13 illustrates a message board page displayed by the web browser of Fig. 2A on screen of a client computer during operation of the computer system of Fig. 1.

Fig. 14 is a block diagram of the exchange enabled by the computer system of Fig. 1.

Fig. 15A is a table illustrating Schedule A used in calculating the suggested price according to Eq. 2.

Figs. 15B1 and 15B2 are tables illustrating Schedules B1 and B2 used in calculating the suggested price according to Eqs. 2 and 5.

Fig. 15C is a table illustrating Schedule C used in calculating the suggested price according to Eq. 2.

Fig. 15D is a table illustrating Schedule D used in calculating the suggested price according to Eq. 2.

Figs. 15E1, 15E2 and 15E3 are tables illustrating Schedules E1, E3 & E4 used in calculating the suggested price according to Eqs. 2 and 7.

Fig. 15F is a table illustrating Schedule F used in calculating the suggested price according to Eq. 10.

Fig. 16 is table providing a guide for interpreting patent rating values.

DETAILED DESCRIPTION OF THE INVENTION

A computer system 100, according to an embodiment of the invention is shown in Fig. 1. Computer system 100 includes a server computer 110 and a plurality of clients 120n (where n = A, B, C, D, etc.) connected via global-area network (e.g., the Internet) 130.

Fig. 2A illustrates the hardware/software structure of a client computer 120n. During operation of computer system 100, a web browser program 210 is executed on top of operating system 220, which in turn controls hardware layer 230. Hardware layer 230, in turn, provides a physical connection to global-area network 130.

Fig. 2B illustrates the hardware/software structure of server computer 110. During operation of computer system 100, server program 240 is executed on top of operating system 250, which in turn controls

hardware layer 260. Hardware layer 260, in turn, provides a physical connection to global-area network 130. Server program 240 also stores and retrieves information in database 270 via operating system 250.

Users of computer system 100 access the patent and license exchange of the present invention via a client computer 120n. Web browser program 210 first establishes a connection to server program 240 over global-area network 130. Users can then access a website for the patent and license exchange via web browser program 210, server program 240 and database 270.

Server computer 110 can be any special or general purpose computer suitable for maintaining a website such as a Pentium-based computer, available from a variety of third parties, an UltraSparc workstation, available from Sun Microsytems, Inc. of Mountain View, Calif., an RS6000 workstation, available from IBM of New York, etc.

Client computers 120n can be any special or general purpose computer suitable for accessing a website over the Internet, such as any a Pentium-based computer, available from a variety of third parties, a Macintosh computer, available from Apple Computer, Inc. of Cupertino, Calif., etc.

Operating systems 220 and 250 are any suitable operating system for controlling client computers 120n and server computer 110 such as Windows98, Windows NT 4.0 or Windows2000, available from Microsoft Corp. of Redmond, Wash., MacOS 8.5, available from Apple Computer, Inc., any version of the Unix operating system, etc.

Web browser program 210 is any web browser program such as Internet Explorer 5.0, available from Microsoft

Corp. or Netscape Navigator, available from Netscape Communications of Mountain View, Calif.

Fig. 3 is a flow diagram of an exchange operation 300, in accordance to an embodiment of the invention. First, in stage 310, a seller stores data describing the IP listed on the exchange in database exchange 270. A sample of the information stored by the seller in exchange database 270 is shown in Figs. 5A-5C. Figs. 5A-5C are partial views of patent information page 500 listing the information captured in exchange database 270 for a given patent listed on the exchange. The buyer can view the information shown in Figs. 5A-5C by simply scrolling the contents of patent information page 500.

A potential buyer can then retrieve the information stored by the seller in exchange database 270 by searching exchange database 270 in stage 320. A search menu page 600 is shown in Fig. 6, while partial views of a search page 700 are shown in Figs. 7A and 7B. The buyer is able to select among several search options on search menu page 600. The buyer can then enter search criteria on search page 700. The buyer can view the information shown in Figs. 7A and 7B by simply scrolling the contents of search page 700. The results of the search are shown in search results page 800 (Fig. 8). The buyer can view the information stored in exchange database 270 for each of the patents returned by the search by simply clicking on a corresponding link on search results page 800. This information is displayed in results information page 900 (Fig. 9).

If the buyer decides to submit a bid on one of the patents listed on the exchange, the buyer can then submit a bid by entering the bid's terms on bid page 1000 (Fig. 10). The bid is received by computer system

100 in stage 330 and transmitted to the seller in stage 340. Fig. 11 illustrates an auction status page 1100 used to notify buyers and sellers on the status of current bids. As shown in Fig. 11, each market participant can act as both a seller and a buyer. The seller can then obtain more detailed information about each bid submitted for the patent by clicking on a corresponding link on auction status page 1100, causing bid detail page 1200 (Fig. 12) to be displayed.

Once the seller has received a satisfactory bid, the seller can accept the bid by selecting a corresponding link on bid detail page 1200. The bid acceptance is received by computer system 100 in stage 350. The buyer is then notified of the acceptance of the bid and the patent is transferred to the buyer in stage 360. Fig. 13 illustrates a message board page 1300 used to communicate the acceptance of the bid and other closing related information to sellers and buyers. Once the transfer of the IP rights listed on the exchange has been completed, operation 300 terminates.

Fig. 4 is a flow diagram illustrating an auction operation 400, in accordance to an embodiment of the invention. Auction operation 400 is similar to exchange operation 300, except that multiple bids may be entertained by the seller in stages 410 and 420. Once computer system 100 has determined that, in accordance to predefined auction rules, the last offer has been received, the winning bid is transmitted to the seller in stage 430. Stage 440 then determines whether the seller has accepted the winning bid, in which case the IP rights are transferred from the seller to the buyer in stage 450. Otherwise, stages

410-440 are repeated until either the seller either accepts a bid or withdraws the lot from the auction.

The exchange website (pbx.com) supports three separate markets: a patent asset market, an asset options market, and a securitized asset cash flows market.

The patent asset market is an electronically-operated forum for buying and selling IP rights. A corporation in need of new products for its product pipeline shops the market, brushing over technologies that are not of interest, while placing bids on those that are. To facilitate this, the exchange provides a user-friendly graphic interface, a comprehensive listing of available technologies, an intuitively easy way to search the listing to find those of interest, and a suggested selling price for each technology offered. The actual price, agreed upon by buyer and seller in the markets, will be independent of the suggested license price. In the interest of expediting transactions, the exchange, provides a suggested price.

The Asset Options Market

Calls and puts on the exchange auction market enable buyers, sellers and long term holders to hedge their IP interests. Similar to the asset market, the options market is an electronically-operated forum for buying and selling IP rights. The specific rights are options to technology which are sold concurrently with an option exercise price that reflects the costs of converting the option into a full license or patent sale. Similar to the asset market, the exchange provides a user-friendly graphic interface, a comprehensive listing of available technology options, an intuitively easy way to search the listing to find

those of interest, and a suggested selling price for each option offered. It is conceivable that a single IP asset could be offered simultaneously as a license and as an option. the exchange electronically monitors the factors affecting pricing continuously so that the recommended asset and option prices are rationally related.

The Securitized Asset Cash Flows Market

This market enables trading in grouped IP assets. The groupings and valuations are modeled on REITs.

Market Participants - Qualified Licensing Agents

The computer system of the present invention provides an ideal IP rights exchange for high integrity participating global buyers and sellers. These participants, known as Qualified Licensing Agents ("QLAs"), must meet certain quality standards as shown in the Table 1 below. Principal QLAs are originators or owners of IP assets or buyers and users of IP assets. Intermediary QLAs are agents acting on behalf of a principal buyer or seller. Government entities, universities and businesses not meeting the exchange's participation criteria or not wishing to participate directly, may buy or sell IP rights through intermediary QLAs, as shown in Fig. 14.

Table 1.

QLA	TRANSACTIONAL QUALIFICATIONS	STANDING QUALIFICATIONS
Government	Applied for a minimum of ten patents per year in each of the immediately preceding three calendar years.	An affiliate of an official State, Federal, United Nations, European Union or Asian government agency.
University	Applied for a minimum of five patents per year	A college or university with state, national

	in each of the immediately preceding three calendar years or maintains an inventory of at least ten unlicensed or otherwise available patents.	government or national educational association accreditation.
Business Entity	Applied for a minimum of five patents per year in each of the immediately preceding three calendar years or maintains an inventory of at least ten unlicensed or otherwise available patents.	An entity for which at least one class of security, of it or an affiliate lists on one of the world's top three exchanges: New York, London or Tokyo, or is a company listed on the Financial Times' World Stock Markets pages (selected on the basis of company capitalization), or is listed on a national exchange certified by the California Commissioner of Corporations under Section 25101 (a) of the California Corporations Code.
Law Firm (Intermediary acting on behalf of a patent buyer or seller)	The firm must, in the aggregate, close licenses and/or sales of at least ten patents per year.	Each attorney participating through the particular firm must be in good standing with at least one state bar or comparable national regulatory authority with a supervising partner who is a

		member in good standing of the patent bar.
Other	Capitalization requirement and bond, terms pending.	Three letters of recommendation from current the exchange qualified licensing agents who are in good standing.

Overview of Auction Process

The auction markets offer a personalized, inviting and friendly environment. A brief description of the market process and the business experience follows. Details of auction operations are provided below.

Exchange Auction Access

The Exchange services two types of participants - QLAs and niche participants. The QLA, whether an attorney or licensing executive, has unlimited access to the site for listing, inventory searches and bidding. The niche participant has access to different elements of the site depending on the terms of the agreement with the exchange.

Auction Flow

The exchange offers an intuitive, easy and fun IP assets search and bid experience.

Searching for patents A powerful search engine lets participants search for particular items on the site. They are able to run queries from exact matches to "and/or" scenarios using a combination of natural language and logic searches.

Navigating the Site An intuitive and elegant menu-driven Web browser makes navigating the sight and completing listing, search and bid forms easy. A

context sensitive help facility supports all software functions.

Exploring Inventory A sophisticated bidder interface reviews online product information including detailed product descriptions and images (graphs, charts, and photos), as well as real-time bid information. This interface provides optimal participation and ease of use.

Scheduling Special Auction Events

One of the crucial success factors for the exchange market is to bring the maximum number of buyers interested in specific IP assets to the opening of special auction events for selected IP assets inventory. A simple means of achieving this goal is to set up a regular auction schedule and publicize in advance so that QLAs can set aside time to participate in the auction.

Exchange Financial Operation

Independent Valuation to Expedite Pricing

Every patent listed on pl-x.com will receive a valuation based on the TRRU valuation model. The actual license price, agreed upon by buyer and seller in the pl-x.com market, is independent of the pl-x.com suggested price. The suggested price is provided by the pl-x.com exchange as a service to both buyers and sellers to help expedite valuation and negotiations. The seller can chose whether to use the TRRU price as their asking price, as their secret floor, or as a point of reference for their own valuation process. The TRRU price is designed to give owners a "reality check," so they don't price a patent out of the market - or undervalue their intellectual property and to give buyers confidence that the asking price is reasonable. The TRRU valuation also assists pl-x.com in determining

the amount of insurance coverage to be provided and the commission due.

TRRU Pricing Model

The pl-x.com TRRU suggested pricing model uses current market variables and the Black-Scholes Options Pricing model and real options theory to create a common ground from which buyer and seller can quickly converge on a fair market value. The TRRU suggested price is derived from a mathematical model that uses as its inputs actual market valuations being assigned to other technologies in the same sub-sector, the state of development of the technology, the cost anticipated in bringing the technology to market, and actual sub-sector investment-return variances. While the value of early-stage products can never actually be known, existing competing products, market conditions, and future revenue can all be assessed quantitatively to derive estimates of a reasonable price of each patent. The variance, values, and cost of capital of other technologies in the same sector are in constant flux. So too the pl-x.com suggested license price will fluctuate on a daily or even on a minute-by-minute basis. This dynamic fluctuation will occur as prices of companies with similar technologies fluctuate in real time in public securities markets. Sellers who elect to use the TRRU price may also elect to activate TRRU dynamic pricing.

For pl-x.com model inputs, "pure play" companies whose value is entirely tied-up in a single product, are selected and tracked using the pl-x.com valuation algorithm for each market sector. The appropriateness of each such company chosen is monitored by the pl-x.com financial operations staff, and additions or deletions are made to each market sector when companies

become diversified, get acquired, or cease developing a product.

TRRU Model Variables

The variables described below are used to calculate continuously PV, the pl-x.com present value of the technology being listed.

1. Time until launch - t is defined as the number of months it would likely take a well-funded corporate entity to turn the patent in its present state of development into a product ready for launch. The value of t for most listings on the license market ranges from 0 (an already-launched product) to 120 (ten years of development and testing needed before launch).

2. Variance of valuations in the sector - s2 is the variance of value (ROI), as it functions mathematically in the Black-Scholes option pricing model, plotted against time for other "pure play" companies in the same sector as the listed patent. Variance is found at thirty second intervals through continuous regression analysis by the software embedded in the pl-x.com website.

3. Future value at launch - FV: Like variance, future value is calculated and continuously re-calculated as the mean market value of "pure play" companies, whose valuation in public markets is tied to a single product at the time of their launch. Like variance, FV can fluctuate from minute-to-minute, because although each of the five or six companies in a particular sector pass the point of their commercial launch only once, the trajectory their valuation is taking, and therefore their projected value at the time they launch, changes with every fluctuation in their stock price.

4. Cost of Capital - r: Like variance and FV, r is derived from a re-calculated mean of the cost of capital of the sector. This is equivalent to the mean trailing one-year return on investment for each of the pure-play companies being surveyed.

5. Option price - OP: Since the technology being evaluated is treated as if it were a real option, the price of the "option" corresponds to the expenditure needed to "exercise" the technology - to develop it, test it, and bring it to market. This development cost, which in the case of medical patents consists mostly of clinical trial costs, is estimated by the pl-x.com valuation staff using a set of standardized tables, and shown to the listing seller before being entered into the patent database being evaluated.

The TRRU price is a value-added service to sellers seeking an independent valuation for the patent and an impartial value estimate that will give buyers piece-of-mind.

These five variables are used to compute the suggested IP price according to Eq. 1 below:

$$SP = PV = OP/(d_1 - FVe^{-rt} d_2) \qquad \text{Eq. 1}$$

where

$$d_1 = (\ln(PV/FV) + (r + (s^2/2)t))/(s^2 t)^{.5}$$

and

$$d_2 = d_1 - (s^2 t)^{.5}$$

The suggested IP price is displayed next to the patent (or other IP asset) listing on the license market portion of the exchange website.

Some patent owners list technologies for which may feel the suggested TRRU(SM) price or the suggested call option price are not appropriate. Such owners feel their technology is so different from all other

technologies that there are no comparable companies with which to calculate variance, FV, and r. For these listings, the exchange offers a second method for IP pricing, the Discounted Revenue (DR) price estimate. The DR price estimate does not replace the suggested price or the suggested call option price on the web page, but rather is posted next to that price.

In general, calculations performed by the exchange staff takes into consideration three features of each IP asset: (1) revenue potential; (2) developmental status, including any potential regulatory hurdles; and (3) competitive risks.

Revenue potential, the reason any buyer would be interested in buying, is a function of the number of potential customers (or patients, if the product is a medical device) of the product, and its ability to differentiate itself from currently available products. Differentiation over existing products tends to determine the degree to which a product will penetrate its market, as shown in Table 2 below:

Table 2.

RATING	PRODUCT FEATURES	EXAMPLES
Worst	Me-too product with drawbacks or limitations	Semiconductor chip concept that costs more to make than those on the market
	Me-too product	Another internet search engine with some patented aspect
	New product with competition (substitutes)	Pain reliever
	New product with no competition but substitutes will easily emerge (first mover advantage)	Voice-driven cars

Best	New product with no competition and significant competitive advantages/barriers to entry	Blood substitutes

The state of development of a particular technology is a second main determinant of the patent value. In general, the closer a product is to being launched, the more valuable the product is. Progress in overcoming regulatory hurdles, such as obtaining marketing clearance from the FDA, is considered in context with how difficult and resource-intensive the remaining regulatory clearances will be. The regulatory environment specific to the technology's sector is factored into this calculation. Most sectors have regulatory environments that can be scaled according to the shown in Table 3 below:

Table 3.

RATING	REGULATORY CONDITIONS
Worst	Multiple regulatory and governing body hurdles. Novel art/product/service with no regulatory precedence set. Single regulatory and governing body hurdles. Novel art/product/service with no regulatory precedence set. Multiple regulatory and governing body hurdles. Prior art/product/service already tested and precedence for regulatory acceptance established Single regulatory hurdle. Prior art/product/service already tested and precedence for regulatory acceptance established
Best	No regulation of art/product/service.

The minimization of competitive risks is the third main determinant of intellectual property value.

Broad, composition-of-matter patents are clearly more valuable than narrow *use* patents, for example. The presence or absence of competitors also affects competitive risks. Table 4 shows some of the patent-realted considerations in competitive risk minimization.

Table 4.

RATING	PATENT FEATURES
Worst	patent is non-exclusive, old and narrow
	patent is non-exclusive, old and broad
	patent is non-exclusive, new and narrow
	patent is non-exclusive, new and broad
	patent is exclusive, old, and narrow
	patent is exclusive, old, and broad
	patent is exclusive, new and narrow
Best	patent is exclusive, new, and broad

A Discounted Revenue Valuation Example: Medical Technology Valuation

The Discounted Revenue valuation methodology becomes much more concrete by showing a specific example. Medical technology, consisting of biotechnology, medical devices, and pharmaceuticals, accounts for a major portion of the total patent volume of the exchange. Medical technology is also one of the most complex sectors for valuation, and provides an excellent illustration of the exchange valuation protocol.

Discounted revenue medical technology valuation schedules

Valuation of all listed technologies begins with the product's potential for eventually generating revenue, calculated in schedule A (Fig. 15A).

Schedules B (Fig. 15B), C (Fig. 15c), and D (Fig. 15D), each produce inputs to the discount rate to be applied to output A, as shown in Eq. 2 below. Schedule E (Fig. 15E) returns the value of upcoming trials that must be performed to make use of the technology. Thus, variable "S," the present fair value of the technology, is based on revenue it is likely to generate, discounted by a rate determined by the risk of it becoming worthless, less the funds needed to develop it:

$$S = A/ (B * C * D)^n - E \qquad \text{Eq. 2}$$

where the letters A, B, C, D, & E refer to the outputs of each of their schedules, below.

Schedule A: Revenue potential

Each technology purchased or optioned has a potential for eventually generating cash for its owner in the form of product sales. This is the basis for its value. Companies often speak of the "market potential" of their products, which they define as the selling price of the product times the number of people who could potentially use it. The exchange method for assessing revenue potential starts out the same way, by taking the prevalence of the disease treated by the product, multiplied by the therapy's predicted average selling price (ASP), again multiplied by the number of times the therapy would be needed per year by a patient, and then by a "significance factor."

The significance factor, laid out in schedule A, quantifies the degree to which the product excels over the current "state-of-the-art" available therapy. It is a concession to the fact that a new, effective therapy that is only mildly better than the current standard of care will probably have poor market

penetration. Conversely, a new therapy that is a dramatic improvement over the current state-of-the-art will likely penetrate a large percentage of the market. It may even capture the entire market, as a dozen or so medical products in the last 50 years have (such as insulin for diabetics and clotting factor VIII for Hemophilia A).

Once the significance factor is determined, Output A is calculated using one of the following two formulae:

For on-going Rx:

Factor A =

(Prevalence) * (Rx ASP) * (Rx's needed per year) * (significance factor from Schedule A) Eq. 3

For one-time Rx:

Factor A =

(Incidence + r * Prevalence) * (Rx ASP) * (significance factor from Schedule A) Eq. 4

Guidelines for choosing the product's significance factor, a measure of how much better the product is than the standard-of-care, are shown in Fig. 15A.

Schedule B: Chance of proving safety and efficacy in trials

Schedule B quantifies the chance that the technology may fail to become a viable product during its interaction with Food and Drug Administration (FDA). The FDA has complete and total regulatory authority over all pharmaceutical, biotechnology, and medical device products. The chance that it will rule against allowing a product to be sold is a real and quantifiable risk, and is made part of the discount

rate by Schedule B. The FDA can deny marketing approval of a product for two distinct reasons: (1) Failure to be proved safe and (2) Failure to be proved effective. Accordingly, Schedule B is composed of two sub-schedules to quantify safety and efficacy risk, B1 and B2, (Figs. 15B1 and 15B2) the outputs of which are multiplied to produce Factor B, as shown in Eq. 5 below.

$$\text{Factor B} = B1 * B2 \qquad \text{Eq. 5}$$

Schedules C & D: Quantifying competitive risk from new market entrants

Schedules C & D deal with Michael Porter's classic "threat of new entrants" risk to a given product. A product's ultimate revenue-generating potential is heavily impacted by the presence or absence of competing products. Existing competing products have already been accounted for in Schedule A, wherein they are part of the current "state-of-the-art," or "status quo." While the exchange patent insurance service protects the buyer from the risk of patent invalidation from "prior art," it does not protect from the chance that the patent may not be broad enough to prevent new entrants to a particular market. Narrowly-defined patents, which may be completely enforceable, may still decline in value by the appearance of a new competing technology.

Different factors come to play to determine if a competing technology appears and renders the first technology less valuable, or altogether obsolete, before and after the product is brought to market. Before its launch, the product is generally known only to people in the industry who typically track the

competitive environment. After its launch, however, the product is likely to become known to a much larger population, particularly if it is a commercial success. In fact, the commercial success of the product will have a direct impact on the number of new competitive technologies that emerge to challenge it (Witness the arrival of Transkaryotic Therapeutics "GA-EPO" patent to challenge Amgen's billion-dollar EPO business). The threat of new entrants arriving before, and after the product's launch, are therefore dealt with in separate schedules: the Antelaunch Obsolescence Factor C, and the Post-launch Obsolescence Factor D.

Schedule C: Chance of avoiding obsolescence from competition until launch

The threat of a new technology emerging to challenge a particular piece of patent before it launches is related to its patent strength, the presence of existing competitors, and the time remaining until its launch, as shown in Fig. 15C.

Schedule D: Chance of avoiding obsolescence from competition after launch

The threat of a new technology emerging to challenge a particular element of a patent after it is commercially available is related to the desirability of the industry, the product' patent strength, the presence of existing competitors, and the amount of publicity the product generates, as shown in Fig. 15D.

Factor D undergoes a final processing step after Schedule D. The output from Schedule D is multiplied by 17 (the average patent life) divided by the number of years remaining in the patent's term. This accounts for the linear and predictable chance that the patent may expire while the product is on the market, allowing

for one of Porter's "new entrants" to drive down the value of the patent.

Factor D =

[Schedule D output] * 17 / [years of patent life remaining] Eq. 6

Schedule E: Cost of Trials Remaining

Cost of trials remaining is defined as the predicted trial cost of running each trial necessary for FDA marketing approval, up to and including Phase III or "pivotal" trials. In the case of non-medical technology, this is analogous to the cost of completing the developmental work remaining on the product necessary to launch it (creating a working prototype, scaling up production, etc.). Trials generally cost between $2,000 and $9,000 per patient to run, modified by the number of centers, length of treatment, and stature of the investigators needed to make the trial convincing to the FDA.

The cost of trials remaining (Factor E) calculation begins with an estimation of the cost per patient, E1, as shown in Fig. 15E1.

The second component of Factor E can be derived without a schedule. E2 is equal to the total number of human patients in all remaining trials needed for market approval.

A highly decentralized study is sometimes required by the FDA, which invariably ends of multiplying costs. This is reflected in the third component of Factor E, called the Center Factor, E3, shown in Fig. 15E2.

The necessity of conducting a trial at a particular type of clinical center, or at a particular "thought leader" institution is likely to add significantly to the cost of conducting trials, since

schedules must be worked around and high-profile people paid, as shown in Stature Factor E4 (Fig. 15E3).

Factor E is found by taking the product of the four sub components:

Factor E (predicted trial cost) = (Cost per patient, E1) * (Number of patients, E2) * (Center Factor, E3) * (Stature Factor, E4) = E1 * E2 * E3 * E4 Eq. 7

Medical license price modifiers

After calculating the suggested license price according to the above procedure, the final suggested listing price may be complicated by two additional factors: non-exclusivity and royalty splits.

Some sellers may wish to offer only non-exclusive rights to their patent, reserving the right to sell it again and again to other buyers. Such a decision clearly makes the technology less valuable to each buyer than it would be if exclusivity were offered.

Some sellers may wish to specify a royalty split, or a range of royalty splits, they are willing to agree to with a potential licensor. The percentage of eventual revenue being

The exchange valuation system deals with these two additional factors as "license price modifiers" - to be applied to the valuation just before listing. They are also both open to change by the listing party even after they are listed. Non-exclusivity decreases the value of a technology only to the extent that firms other than the buying firm exist that have the resources and inclination to license it in the future. For this reason, the suggested license price for a technology being listed non-exclusively is reduced by

dividing it by an "industry competition factor, " defined in Schedule F (Fig. 15F).

Factor F, used only when a license is offered Non-exclusively, reduces the suggested listing price, S, by:

$$\text{List price} = S / F \qquad \text{Eq. 8}$$

The quantitative treatment of a royalty split is even more straightforward and does not need a schedule. The percentage of the product's revenue the seller is intending to keep is subtracted from the patent's valuation (e.g., if a listing party intends to keep an 8% royalty on the product it wants to sell, the final price is multiplied by 0.92).

Therefore, the final suggested license price posted next to each technology listing in the exchange license market offered exclusively is calculated by Eq. 9:

$$S = A/ (B * C * D)^n - E \qquad \text{Eq. 9}$$

The suggested price for non exclusive listings involves an extra cut from Factor F, as shown in Eq. 10:

$$S = (A/ (B * C * D)^n - E) / F \qquad \text{Eq. 10}$$

Discounted Revenue Valuation for Non-medical patent

The medical valuation methodology example described for the three markets above is specific for medical intellectual property. Valuing medical patents generally requires far more steps than valuing patents in almost any other field. This is largely because no other field has a regulatory authority that corresponds to the FDA that links most of the value of the typical medical patent to its status and prospects with the

FDA. Technology in few other fields, for example, can appear initially promising but later turn out to be unsafe for human use and therefore unmarketable and completely worthless.

Valuing computer software patents on the exchange turns out to be merely a simplified form of the algorithm for medical technology. Schedule B (chance of proving efficacy and safety) and Schedule E (Cost of remaining trials) are removed, and a new Schedule E (Cost of remaining development) is substituted. Schedule A is also modified, as predicting revenue potential for computer software uses different market size analysis techniques than are used to size up patient populations.

Non-Medical Schedule E: Cost of development remaining

Predicted development cost in non-medical technology, rather than being the result of patients required for each phase of clinical trials remaining, is linked to the human-hours worth of computer code, program "debugging," or similar time-consuming tasks standing in between the technology in its current state and the state it must be in by the time it is launched as a product.

Patent Risk Rating And patent Validity Insurance

A patent refers to a bounded region of intellectual property. As intellectual property is to real property and as a patent is to a real property title, so is patent validity insurance to property title insurance. This mandatory insurance product helps reduce the buyer's risk, and is one of the risk transfer elements that the exchange provides to expedite patent sales and license transactions.

Just as each patent will receive a TRRU price before it is posted on the pl-x.com patent market,

each patent will receive automatic validity insurance. The availability of patent insurance creates a more risk-free marketplace by reducing the risk that buyers and sellers bear in each patent sale. pl-x.com is also working to create a complete package of patent insurances including validity plus, infringement, and enforcement insurances to facilitate the safe and efficient commercial transfer of quality patents and licenses.

Patent Validity Insurance

The patent validity insurance coverage will automatically cover every patent and license transaction closing on pl-x.com. This innovative risk transfer product will enhance pl-x.com market liquidity because each pl-x.com patent buyer or licensee will be insured for the amount of the up-front purchase price paid for each patent and license. Patent validity coverage indemnifies the buyer or licensee against the risk of financial loss that can arise when the purchased patent is declared invalid. Invalidity could be declared, for example, if the inventor or patent applicant failed to disclose information in the patent application process or because of outright fraud, such as a fictitious patent or a patent offered for sale by someone other than its owner. Coverage can be provided for the buyers' purchase price or license fees, plus tooling costs and even for investment in developing the new product from the patent rights acquired.

Additional Patent Insurance Products

In addition to automatic patent validity insurance, coverages will be made available to cover business transacted on pl-x.com. These include (1) Patent Validity Plus for the risk of loss due to

invalidity of additional amounts to be invested in product development going forward, (2) Infringement for the risk of patent infringement liability, and (3) Enforcement for a legal expenses limit for the enforcement of patent rights against others who infringe on the rights transferred.

Exchange Escrow Operations

A degree of trust and security between buyers and sellers is needed for any transaction to take place. An entire industry has evolved that provides trust and security in real estate transactions - the third party escrow. An escrow officer holds transaction documents from one party and the cash consideration from the other, deducts costs and fees, and, upon instructions from the parties, releases the documents and cash. This service provides both parties with a high degree of confidence that the transaction will close as anticipated, and each side will receive the benefit of its respective bargain. No institutional, third party escrow service currently exists for buying and selling patents.

The patent market has a present, acute need for a neutral escrow service. For example, in order for a business development executive at an orthopedic implant company in Tennessee to acquire a license for a bone growth protein from a bioengineering company in Finland, the Tennessee buyer must feel secure and confident that the cash wired to a Finnish bank or other financial intermediary will be appropriately handled and will result in the delivery of the bone protein patent. Currently, the participants in international patent exchanges take the risk that local law and custom will protect their respective interests. However, neither the American nor the

Finnish party will be willing to learn the details of international contract law nor will they take the chances on the other party following through without some kind of third-party assurance. Furthermore, the concept of hiring local legal representation is both expensive and potentially unreliable.

The patent escrow service is a third party intermediary which holds the consideration from Tennessee and the patent title from Finland, and disburses neither item to the opposite party until both have been received and verified. Furthermore, the patent escrow, in being impartial, is responsible for complying with the requirements of local law for such transfers and for the collection and payment of fees, costs and commissions. The patent escrow agent will operate under contract from the exchange, and will receive compensation for this service according to a fee schedule.

In addition to escrow, pl-x.com will provide on-line document management tools to help both parties manage the paperwork involved in each deal closing. The tools enable both parties in the deal to talk in a secure on-line space, to edit and review password-protected documents, and to track the progress of deal documentation all in a paperless environment. pl-x.com management believes that this service, originally designed for the financial community, will further reduce the time it takes to close technology transfer deals and will offer both parties increased control over the documents involved.

Licensing Administration Operations

The exchange fills an unmet need for cost-effective after-market licensing administration. Many

companies do not have a dedicated licensing department, adequate administrative budgets, or license and royalty compliance monitoring. Potential revenue is lost.

The exchange licensing administration service uses a powerful information technology network for processing, tracking, and reporting royalties. This service is executed in cooperation with the exchange escrow service. A patent buyer will respond to a royalty questionnaire which will be based on the transaction terms agreed to at closing and that were filed with the exchange escrow service. The questionnaire will be processed electronically, reviewed by the exchange staff for inconsistencies, and then forwarded to the seller for acceptance. After the report has been accepted by the seller, the buyer will immediately receive wire instructions to deposit the appropriate royalty into a special bank account maintained for the benefit of the exchange escrow service. Simultaneously, the escrow service is notified to expect the wire. The escrow service, in turn, immediately confirms receipt of the funds and is responsible for wiring the funds to the seller.

Financial Operations for The Options Market

The options market, the second of the three the exchange patent markets, allows for trading in both call and put options, so long as market participants (companies or third-party hedgers) are willing to offer them. Different motivations for trading are expected to arise depending on who is buying and selling each type of option.

Options Traded Between Other Sellers and Buyers

Call Options

A patent call option is the contractual right to

purchase a technology from its owner at a predetermined price before a set expiration date. Buying the technology for the predetermined price is referred to as "exercising" the option, and the "exercise price" tends to be similar to the price that would be charged for exclusively licensing the technology outright from the beginning. Owning an patent call option gives the assurance that no competitor will be able to buy or license the technology until the option either expires or is exercised.

A risk-averse corporate entity, with an interest in a particular patent listing, may want to purchase a call option before beginning experiments or clinical trials to see if the technology works. If the technology development is successful, the entity exercises its option and owns the patent license. If it fails to meet the entity's requirements, or if the entity's business changes during the development, the option is allowed to expire, having spent much less money than it would have had it bought or licensed the patent outright from the beginning.

The patent owner who issues "writes" the option also benefits: If the option buyer decides it likes the technology and exercises its option, the option writer receives the exercise price (normally equal to a comparable license fee if the technology were licensed outright from the beginning) plus the option price it collected when the option was written. If the buyer decides not to exercise the option, the writer keeps the option price it collected and it keeps 100% ownership of the patent, on which it can go on to offer another option to another market participant. Thus, there is a clear motivation for both call option buyers (corporate developers), and

call option writer (University with patent lying fallow), to trade in this way.

Put Options

There is little motivation for a corporate developer to buy a put option (the right to sell an patent listing back to the original owner for a predetermined price) if call options are offered, since buying the technology plus a put is equivalent to buying a call and loaning the patent research institution cash. The put writer's motivation is to convince a buyer to buy the patent, and to get a cash "loan."

The price of the put option is normally proportional to risk of failure of the technology. When the risk is very high, the put option price will approach the present value of the exercise price, (exercise price)/(1 + risk free rate)^n. Similarly, the exercise price would be a function of the purchase price of the patent, and when the risk is very high would approach the future value of the purchase price, (purchase price)(1 + risk free rate)^n. In the hypothetical extreme case, where both parties know there is no chance of the technology working, the put price become equal to the purchase price and the strike price becomes the future value of this figure at the risk-free interest rate - buying a put option would be like buying a government bond.

Options Traded Between Other Parties

Call Options

A fraction of a call option can be bought by a second corporate developer if the first developer is cash-limited and is willing to split the eventual ownership of the product by a predetermined percentage. The second corporate developer may have

heard about the technology late and want to get at least part of it. The first developer could list this "fractional call option" back on the same exchange where it found it.

Alternatively, a developer in need of cash who is working on a high-profile technology could offer minute fractions of a call option to the public. This can be done, whether the developer bought the call option from an patent option writer, or is creating the option from its own endogenous technology. This kind of "patent option offering" is analogous to a public equity offering, only the company offering the patent equity is doing so with the understanding that it may decide to "go private" at some predetermined date several years in the future - buying back all the pieces of the call, at a premium, if the technology works out. It is feasible that the company could afford such a cash outlay, which could be much larger than the cash it received when it sold the patent calls to the public in the first place, because it will be better able to raise cash through other means once it has a workable product. This is a high-risk form of investment, since the public has no assurance that the developer will do its best to develop the patent, and the eventual value of the patent call option is related to the patent's development.

Put Options

A third-party nay-sayer may have reason to buy a put option from a corporate developer who bought it from the original owner. Although the put option cannot be exercised without the patent, the third party nay-sayer may feel confident that the developer will fail at developing the technology, and therefore need to get the put option back in order to "put" the

patent back to the original owner. In this case, the developer would be forced to buy the put option back from the third-party nay-sayer, at a free-floating price that would obviously be higher than the price the nay-sayer paid for it (but always lower than the exercise price). The nay-sayer would therefore have won his "bet" and profited. The nay-sayer buyer would want to know the exercise price of the option from the very beginning even though he can never exercise it, because this is the upper limit of his pay-back.

As an additional service to both buyers and sellers, the the exchange valuation staff determines and posts its quantitative valuation estimate of each listed option. The procedure for doing this is described in detail in the the exchange Technology Valuation Manual. Relevant factor for pricing options are all included in the five inputs to the Black-Scholes model.

The "S" input into the Black Scholes option pricing model is, conveniently, also equal to the the exchange suggested price for purchasing the technology outright.

Valuation in the Options Market

Suggested values are posted next to each option listed on the options market, similar to the procedure in the license market. Valuation of technology that underlies each option is the first step, and is performed in exactly the same way as in the license market.

In many cases, the same technology will be offered for license or for optioning. The same numeric technology value is then used for the variable 'S." The "S" input into the Black Scholes option pricing model is, conveniently, also equal to the

suggested price for purchasing the technology outright.

Black Scholes:

Fair value = $S * (d_1) - Xe^{-r(T-t)}(d_2)$ Eq. 11

Where

$d_2 < d_1$ and

d_1 and d_2 are both lognormal-distributed

Discounted Revenue Valuation Non-medical patent Options

Similarly, options valuation for non-medical patent follows a simplified.

The accuracy of the Discounted Revenue valuation methodology in all three markets is dependent not only on proper use of the schedules in section I and the equations in sections I - IV, but also on the on the schedules themselves outputting appropriate numerical coefficients. To keep the entire process as an accurate predictor of real-world prices buyers are willing to pay for technologies with particular parameters (revenue potential, years until launch, level of competition, etc.), these coefficients must be continually regressed against real-world data.

Intellectual property is currently bought, sold, and partnered by companies and institutions without the use of an exchange. Such transactions, however, are important to the exchange Financial Operations because they provide examples of exactly how much particular technologies are selling for. In other words, each technology that has already been sold or partnered, for which the purchase price was disclosed, serves as an additional example that can be fed into the exchange schedules and equations, with a known answer.

Formal regression analysis can be used to apply real-world patent transaction data to the exchange valuation equation (Eq. 9).

Since this is a 7-variable equation, seven or more real-world transactions are needed to uniquely solve it for appropriate levels of A, B, C, D, E, F, and n. Examples in which the technology's parameters (revenue potential, years until launch, level of competition, etc.) are well known are fed into the schedules while performing the multiple regression. Multiple iterations of this regression exercise are then used to re-calibrate the left-hand column numbers on each schedule, A-F. The goal of the re-calibration is to cause the entire valuation algorithm to produce the value corresponding to the price for which the technology was actually sold, while ensuring that no single variable has an unduly large effect.

Patent Rating

For each patent listing fed through the Discounted Revenue valuation, the exchange staff also provides an patent risk-level rating, referred to as the patent rating. The suggested dollar value of each the exchange listing is mathematically highly influenced by the risk level of the technology listed. The risk level is accounted for by the discount rate in Eq. 8, (B * C * D), raised to the power of n, the number of years remaining until launch $(B * C * D)^n$.

The discount rate can range from 1.00 (for a product with no safety concerns, known efficacy, already commercially available, with a dominant composition-of-matter patent in an industry with no competitors and high barriers to entry) to as high as approximately 19.11 (for an early-stage technology more than five years away from launch with known

competitors in a highly desirable industry, protected by a narrow patent, where previous trials have failed to prove efficacy and patients deaths have been reported). This discount rate is listed on the exchange, next to the suggested price for each technology, as an patent rating. The patent rating, intended in the same manner as the Moody's ratings of corporate bonds, is meant to provide buyers with another tool with which to assess listed technologies. The exchange search engines are also equipped to search specifically for technologies with a given patent rating range. A guide for interpreting the patent rating is shown in Fig. 16.

Financial Operations for The Securitized Asset Cash Flows Market

The most complex of the three the exchange markets, the cash flows markets allows for the buying and selling of small pieces of groups of technologies bundled together. Cash flows unit trading is the only example of the exchange transactions that are not currently occurring between buyers and sellers in off-exchange private negotiated deals. IP holders may bundle a group of technologies, "securitize" them into units, and lists these units, or options to own the units, on the cash flows exchange.

Large research institutions may be the most likely candidates to offer cash flows, as they have large quantities of related patents that would lend well to a cash flows format.

Valuations in the Cash Flows Market

The suggested value for each listed cash flows unit is analogous to the book value typically listed for each REIT (Real Estate Investment Trust) unit in today's REIT market. Each patent property bundled

together in a particular cash flows is evaluated according to the methodology described above. The sum of these values is then divided by the number of shares outstanding in the cash flows. This technology "book value" is then listed on the cash flows exchange next to each cash flows. The actual bid and ask price for each cash flows is determined by supply and demand, just as the case with bulletin-board listed REITs. And, as with REITs, market price and book value are often disparate. The posted book value of cash flows, however, changes more frequently than the posted book value of REITs, since the exchange Financial Operations OPT algorithms constantly update the suggested price of all units of patent pertinent to each cash flows.

Data Sources

For purposes of re-calibrating the exchange valuation coefficients, "data" consists of examples of real-world intellectual property transactions in which both the nature of the technology and the purchase price are disclosed. Such data is critical for continually refining our valuation model, as described above. Data for this purpose is continually generated by buyers and sellers and feed back into the exchange model. Prior to trading on the exchanges, however, data is to be tabulated from press releases, from trade publications that feature technology transfer deals, and from companies and research institutions themselves.

Examples Of Industry Categories For Continuous Variance Of Returns, (Sigma Squared) And Future Value At Launch (FV) Calculation

The variance (sigma2) and future value at launch (FV) inputs into the exchange suggested list price

calculation are derived from the exchange Pure-play database, which contains approximately 5-10 publicly traded "pure play" companies in each of 185 fields of technology. Sigma2, for example, is the computed variance about the mean of the natural log of stock price returns of each of the 5-10 companies in the category in question. FV is the mean market capitalization of the pure-plays at the time they launched or are projected to launch their lead product. Both values are calculated and re-calculated on a minute-by-minute basis by the exchange operating computer code during stock exchange trading hours. When the business of a company changes, or when it diversifies and can no longer be considered a "pure play" it is taken out of the database. As new companies appear, they are added to the database by the Financial Operations research staff, similar to the way the Dow Jones News Corp. occasionally adds and replaces companies in the Dow Jones Industrial Average.

Auction Function

The exchange auction web site supports the following functions.

Initial buyer/seller registration. This step deals with issues relating to authentication of trading parties, exchange of cryptography keys, and the creation of a profile for each trader that reflects his/her interest in specific patent.

Setting up a particular auction event. This second step includes describing the item being sold or acquired and setting up the rules of the auction. The auction rules explain the type of auction being conducted (open cry, sealed bid, Dutch), parameters negotiated (price, delivery dates, terms of payment,

etc.), starting date and time of the auction, auction closing rules, etc.

Bidding. The bidding step implements the bid control rules of the auction (minimum bid, bid increment, deposits required with bids) and for open cry auctions, notifies the participants when new high bids are submitted.

Evaluation of bids and closing the auction. This step implements the auction closing rules and notifies the winners and losers of the auction.

Trade settlement. This final step covers communicating the terms of the transfer and the next steps required for clearing the sale and securing transfer of patent rights for terms of sale.

Auction Formats

Open Cry

Open cry auctions take the public meeting approach. In this approach the response to each bid, for example, a higher counter-bid by another party, or the decision to close the auction, happens in a short time, sometimes in few seconds. These auctions work allow prospective buyers to: participate in the auction at the same time; and feel comfortable making counter bids in a few seconds. Traditionally such auctions are conducted with all participants present at the same location such as meeting/auction room where inter-party communication is instantaneous. Remote participation by phone and through proxy (order bid) is limited.

Sealed Bid

Sealed bid auctions are practiced when it is impractical for the bidders to prepare counter bids instantaneously. This could be because it takes time to prepare a counter bid, the prior bid information

needed to prepare the counter bid, such as the prior bid, can not be disseminated to the other bidders instantaneously, or because the bidders are not available to participate in the auction at the same time. In single round sealed bid auction, all bidders submit their bids by a deadline, and the bids are evaluated at this deadline. In multi round sealed bid auctions, there is a deadline for each round of bids, and at that deadline either the auction is closed or a fresh round of bids is solicited by some new deadline.

Single and Multiple Round Sealed Bid

Single round sealed bid auctions lack the competitive atmosphere (bidding frenzy) in open cry auctions which encourages the bidders to outbid their rivals. Multiple round sealed bid auctions recreate some of the intensity and interest of the open cry format, however, this auction can be held over an unlimited time period until the ask price is met.

Bulletin Board Bid

Another bidding alternative is to use an electronic bulletin board approach. Information about the prior bids is published on the bulletin board, but new bids are not required in seconds. The bidders can monitor the bulletin board a few times a day for a few days, and they have a chance to offer counter-bids to the existing highest bid. This approach alleviates the communication latency and simultaneous participation requirement of the open cry auction, but retains its competitive nature.

Control of Bids/Offers

In an auction, the initiator of the auction or the exchange can either require the participants to submit bids or announce its own bids to see if there are participants willing to conduct trade at his bid

price. When the participants provide the bids in open cry or bulletin board auction, each successive bid is higher than the previous one.

When the exchange auction master puts up the bids, he can either start with a high bid, perhaps at which no bidder is willing to trade, and lower the bid gradually until he has sufficient bidders to clear his inventory. This is the Dutch auction in real time. Alternatively he can start at a low bid, low enough at which there are more buyers than his inventory, and increase his bid until the number of buyers willing to buy his merchandise matches his inventory.

Setting The Trading Price

Once the bidding phase is over, the bidders with the highest bids get the patent being auctioned. But the price they pay could be the same as what they bid or lower. In Discriminative Auction, also known as Yankee Auction, the bidders pay their actual bid amounts. When the bidders are repeat customers of the seller, dissatisfaction among the bidders who have to pay a higher price compared to other bidders is sometimes of concern. This is addressed by allowing the bidders with winning bids to pay the price paid by the winning bidder with the lowest bid.

This latter policy is widely known in literature as Dutch Auction, but we will refer to it as a Non discriminative Auction, because the term Dutch Auction is also widely used to describe auctions where the exchange starts with a high price and bids the price lower while buyers have the option of buying the items at any time at the current bid price. Non-discriminative auctioning is widely used by corporations to repurchase their shares (though it is referred to as Dutch auction in this context).

A variation of the Non discriminative auction called Vickrey Auction was proposed by 1996 Economics Nobel laureate, William Vickrey. Here the winning bidder pays the price bid by the highest non winning bidder. This policy is stated to create a disincentive for speculative bidding and encourage the bidders to submit bids reflecting their true value for the item being auctioned.

Additional Auction Policy Variations

Each of the following policy choices is applicable to several, if not all, auction methods described above.

Anonymity

Many factors go into deciding what information about bids should be made available to bidders before and after the closing of the auctions. In an open cry auction, one could conceal the identity of the bidders, or conceal the association between the bidders and the bids. In sealed bid auctions, the identity of the bidders and/or their bids could be revealed to other bidders after the close of auction. Alternatively, only the winning bids and/or bidder's identity could be revealed. Given the deep pockets of potential bidders, it may be prudent to protect the identity of all bidders to prevent a lack of bidding from smaller, less well funded bidders.

Restrictions On Bid Amount

In all auctions the seller can specify the minimum starting bid. When auctions of the same kind of item happen regularly, the minimum bid is usually some fraction (70%) of the lowest winning bids averaged over a specified number of preceding auctions. To speed up the bidding process, minimum bid increments are often enforced. The bid increment is

roughly proportional to the current bid, i.e., they are smaller for lower bids and larger at higher bids.

Rules For Closing The Auction

Open cry auctions can finish by a posted closing time. Alternatively, the auctions can be kept open until new bids continue to arrive within some time interval of the preceding bid. One could also choose to close the auction if either of the above two conditions is met or only when both conditions are met. Dutch auctions could close at a pre specified time, when all the inventory has been sold, when the price has fallen to a pre specified level, or at some combination of these three conditions. This format is likely to be the winning formula for the exchange and its patent exchange.

Evaluation Rules And Breaking Tied Bids

All auctions will have some rule for evaluating bids. When an item is being sold in an auction, generally a higher bid would be better than a lower bid. But other factors such as terms of payment can factor in a comparison of two bids. For example, a bid requiring delivery of goods on a schedule convenient to the seller may be preferred over another bid that matches the first one in all respects but has a delivery schedule inconvenient to the seller. Advance payment or payment on delivery may call for a higher valuation of the bid compared to a bid where payment is due within 90 days of delivery.

If multiple bids tie at the same value and the available inventory can satisfy some but not all of the bids, tie breaking rules are required. Preference may be given to bids that are for larger quantity, and in case of two bids specifying the same quantity preference could be given to the bid that arrived

earlier. If the seller maintains a history of its auctions, it can give preference to the bidder with whom he had better business dealings in the past.

Services Provided To Sellers And Bidders

Reserve prices (hidden lower limit on price acceptable to seller) is one service that the the exchange can provide to the seller. Other high-value services will include a credit check and certification of all bidders, patent insurance to prevent against patent default, escrow and clearing services. Order bid (bidding through the exchange provided proxy to a qualified Licensing Agent) is an important service that the exchange can provide to the bidders. Alerting registered bidder to upcoming auction events and hosting special auction events are other marketing services that help create an efficient marketplace.

Security Considerations

Security mechanisms are needed to ensure that the site announcing the auction and its rules is not sabotaged by an outsider. This includes preventing unauthorized postings and alterations as well as preventing denial of service attacks. Cryptographic tools that prove that a particular auction notice was posted and accessible during a certain time period will be very useful.

During the bidding phase cryptographic tools will ensure that a bid submitted is not tampered with and that it is not disclosed to other bidders in violation of the auction rules. In open cry auctions, a verifiable connection from every bid to a known bidder will demonstrate chain of bid for verification.

Terms and Conditions

The exchange bidding process allows the buyers to request specific payment or shipping terms, these

terms and conditions will be treated as part of the bid. The auction chart will display the offered terms and conditions along side the bids shown. Further, when creating the product description, the seller will specify the range of terms and conditions acceptable to him and indicate how they are factored in bid evaluation.

Retraction of Auction and Bids

During the bidding phase, under certain conditions the seller may be allowed to stop or withdraw the auction or modify the rules. Similarly, under certain conditions the bidders will be allowed to withdraw or modify their bids.

Closing The Auction

The auction close according to the closing rules specified. At this time, the winning bids can be treated as, and if needed translated to, traditional purchase orders. At the closing of the auction, the following additional activities need to take place.

Notification

The exchange must communicate the results of the auction to the bidders. Depending on the auction policy, some information will be made available publicly, some common information will be made available to all bidders, and some will be communicated only to bidders to whom it is relevant. Once again security and privacy tools are needed.

Record Retention

To prove to the bidders and the seller that the auction was conducted fairly, the auction record is digitally signed by the exchange.

Embodiments described above illustrate but do not limit the invention. In particular, the invention is not limited to any particular hardware/software used

to implement the computer system of the present invention.

In the preferred embodiment, the seller maintains a high degree of control in closing the auction for the seller's intellectual property. At the time of inventory posting, the seller designates the rules for selecting the auction winner. Such rules may include highest cash price, highest royalty rate, highest bid within a specified time period, or some other parameter or combination of parameters determined exclusively by the seller.

CLAIMS

We claim:

1. A computer system for enabling an exchange of intellectual property rights between sellers and buyers of intellectual property, the computer system comprising:

at least one server computer;

one or more client computers connected to the server computer via a global-area network; and

a computer program executed by the server computer;

wherein the computer program further comprises computer instructions for:

storing information about the intellectual property listed on the exchange in a database;

searching the database for information about the intellectual property listed on the exchange according to one or more search criteria specified by a buyer;

receiving a bid to acquire rights in intellectual property listed on the exchange from a buyer;

transmitting the bid information to a seller of the intellectual property rights for which the bid is submitted;

receiving an acceptance of the bid from the intellectual property owner; and

transferring intellectual property rights from the seller to the buyer in response to the seller accepting the buyer's bid.

2. The computer system of claim 1, wherein the intellectual property rights include licenses or assignments of the intellectual property.

3. The computer system of claim 1, wherein the computer program further comprises computer instructions for determining a valuation and risk assessment of the intellectual property stored in the database.

4. The computer system of claim 1, wherein the computer program further comprises computer instructions for transferring the intellectual property rights from the seller to the buyer using a closing service.

5. The computer system of claim 1, wherein the computer program further comprises computer instructions for transferring the intellectual property rights from the seller to the buyer using an escrow service.

6. The computer system of claim 1, wherein the computer program further comprises computer instructions for enabling the buyer to obtain insurance for the intellectual property owned by the seller.

7. The computer system of claim 6, wherein the insurance covers a purchase price and any advanced royalties paid by the buyer of the intellectual property rights in case the intellectual property is found to be invalid by a court.

8. The computer system of claim 6, wherein the computer program further comprises computer instructions for enabling the buyer to optionally purchase additional insurance to cover development

costs and investments in developing the intellectual property in case the intellectual property is found to be invalid by a court, intellectual property infringement insurance, attorneys' fees insurance, and intellectual property enforcement insurance.

9. The computer system of claim 1, wherein the global-area computer network further comprises the Internet.

10. The computer system of claim 1, wherein the database comprises information from legal instruments conveying the intellectual property rights, marketing information provided by the seller and technology classification information.

11. The computer system of claim 1, wherein the computer program further comprises computer instructions for automatically providing access to the information stored in the database to a buyer based on a buyer's profile provided by the buyer and on the buyer's historical purchasing patterns as recorded by the computer program.

12. The computer system of claim 1, wherein the computer program further comprises computer instructions for:

receiving one or more bids to acquire rights in intellectual property listed on the exchange from buyers;

selecting a winning bid among from the bids received from the buyers according to a set of auction rules;

transmitting the winning bid information to a seller of the intellectual property rights for which the bid is submitted; and

receiving an acceptance of the winning bid from the intellectual property owner.

13. The computer system of claim 1, wherein the computer program further comprises computer instructions for:

obtaining qualification information from potential buyers and sellers; and

allowing only qualified buyers and sellers to trade intellectual property rights listed on the exchange.

14. The computer system of claim 1, wherein the computer program further comprises computer instructions for collecting, analyzing, and publishing intellectual property market activity data.

15. The computer system of claim 1, wherein the exchange further comprises a license/assignment market, an option market and a securitized asset cash flows market.

16. A method for enabling an exchange of intellectual property rights between sellers and buyers of intellectual property using a computer system comprising at least one server computer and one or more client computers connected to the server computer via a global-area network, the method comprising:

storing information about the intellectual property listed on the exchange in a database;

searching the database for information about the intellectual property listed on the exchange according to one or more search criteria specified by a buyer;

receiving a bid to acquire rights in intellectual property listed on the exchange from a buyer;

transmitting the bid information to a seller of the intellectual property rights for which the bid is submitted;

receiving an acceptance of the bid from the intellectual property owner; and

transferring intellectual property rights from the seller to the buyer in response to the seller accepting the buyer's bid.

17. The method of claim 16, wherein the intellectual property rights include licenses or assignments of the intellectual property.

18. The method of claim 16, further comprising determining a valuation and risk assessment of the intellectual property stored in the database.

19. The method of claim 16, wherein further comprising transferring the intellectual property rights from the seller to the buyer using a closing service.

20. The method of claim 16, further comprising transferring the intellectual property rights from the seller to the buyer using an escrow service.

21. The method of claim 16, further comprising enabling the buyer to obtain insurance for the intellectual property owned by the seller.

22. The method of claim 21, wherein the insurance covers a purchase price and any advanced royalties paid by the buyer of the intellectual property rights in case the intellectual property is found to be invalid by a court.

23. The method of claim 21, further comprising enabling the buyer to optionally purchase additional insurance to cover development costs and investments in developing the intellectual property in case the intellectual property is found to be invalid by a court, intellectual property infringement insurance, attorneys' fees insurance, and intellectual property enforcement insurance..

24. The method of claim 16, wherein the global-area computer network further comprises the Internet.

25. The method of claim 16, wherein the database comprises information from legal instruments conveying the intellectual property rights, marketing information provided by the seller and technology classification information.

26. The method of claim 16, further comprising automatically providing access to the information stored in the database to a buyer based on a buyer's profile provided by the buyer and on the buyer's historical purchasing patterns as recorded by the computer program.

27. The method of claim 16, further comprising:

receiving one or more bids to acquire rights in intellectual property listed on the exchange from buyers;

selecting a winning bid among from the bids received from the buyers according to a set of auction rules;

transmitting the winning bid information to a seller of the intellectual property rights for which the bid is submitted; and

receiving an acceptance of the winning bid from the intellectual property owner.

28. The method of claim 16, further comprising:

obtaining qualification information from potential buyers and sellers; and

allowing only qualified buyers and sellers to trade intellectual property rights listed on the exchange.

29. The method of claim 16, further comprising collecting, analyzing, and publishing intellectual property market activity data.

30. The method of claim 16, wherein the exchange further comprises a license/assignment market, an option market and a securitized asset cash flows market.

31. A computer-readable storage medium operatively coupled to a computer system for enabling an exchange of intellectual property rights between sellers and buyers of intellectual property, wherein

the computer system comprises at least one server computer and one or more client computers connected to the server computer via a global-area network, the computer-readable storage medium comprising computer instructions for:

storing information about the intellectual property listed on the exchange in a database;

searching the database for information about the intellectual property listed on the exchange according to one or more search criteria specified by a buyer;

receiving a bid to acquire rights in intellectual property listed on the exchange from a buyer;

transmitting the bid information to a seller of the intellectual property rights for which the bid is submitted;

receiving an acceptance of the bid from the intellectual property owner; and

transferring intellectual property rights from the seller to the buyer in response to the seller accepting the buyer's bid.

32. The computer-readable storage medium of claim 31, wherein the intellectual property rights include licenses or assignments of the intellectual property.

33. The computer-readable storage medium of claim 31, further comprising computer instructions for determining a valuation and risk assessment of the intellectual property stored in the database.

34. The computer-readable storage medium of claim 31, further comprising computer instructions for

transferring the intellectual property rights from the seller to the buyer using a closing service.

35. The computer-readable storage medium of claim 31, further comprising computer instructions for transferring the intellectual property rights from the seller to the buyer using an escrow service.

36. The computer-readable storage medium of claim 31, further comprising computer instructions for enabling the buyer to obtain insurance for the intellectual property owned by the seller.

37. The computer-readable storage medium of claim 36, wherein the insurance covers a purchase price and any advanced royalties paid by the buyer of the intellectual property rights in case the intellectual property is found to be invalid by a court.

38. The computer-readable storage medium of claim 36, further comprising computer instructions for enabling the buyer to optionally purchase additional insurance to cover development costs and investments in developing the intellectual property in case the intellectual property is found to be invalid by a court, intellectual property infringement insurance, attorneys' fees insurance, and intellectual property enforcement insurance..

39. The computer-readable storage medium of claim 31, wherein the global-area computer network further comprises the Internet.

40. The computer-readable storage medium of claim 31, wherein the database comprises information from legal instruments conveying the intellectual property rights, marketing information provided by the seller and technology classification information.

41. The computer-readable storage medium of claim 31, further comprising computer instructions for automatically providing access to the information stored in the database to a buyer based on a buyer's profile provided by the buyer and on the buyer's historical purchasing patterns as recorded by the computer program.

42. The computer-readable storage medium of claim 31, further comprising computer instructions for:

receiving one or more bids to acquire rights in intellectual property listed on the exchange from buyers;

selecting a winning bid among from the bids received from the buyers according to a set of auction rules;

transmitting the winning bid information to a seller of the intellectual property rights for which the bid is submitted; and

receiving an acceptance of the winning bid from the intellectual property owner.

43. The computer-readable storage medium of claim 31, further comprising computer instructions for:

obtaining qualification information from potential buyers and sellers; and

allowing only qualified buyers and sellers to trade intellectual property rights listed on the exchange.

44. The computer-readable storage medium of claim 31, further comprising computer instructions for collecting, analyzing, and publishing intellectual property market activity data.

45. The computer-readable storage medium of claim 31, wherein the exchange further comprises a license/assignment market, an option market and a securitized asset cash flows market.

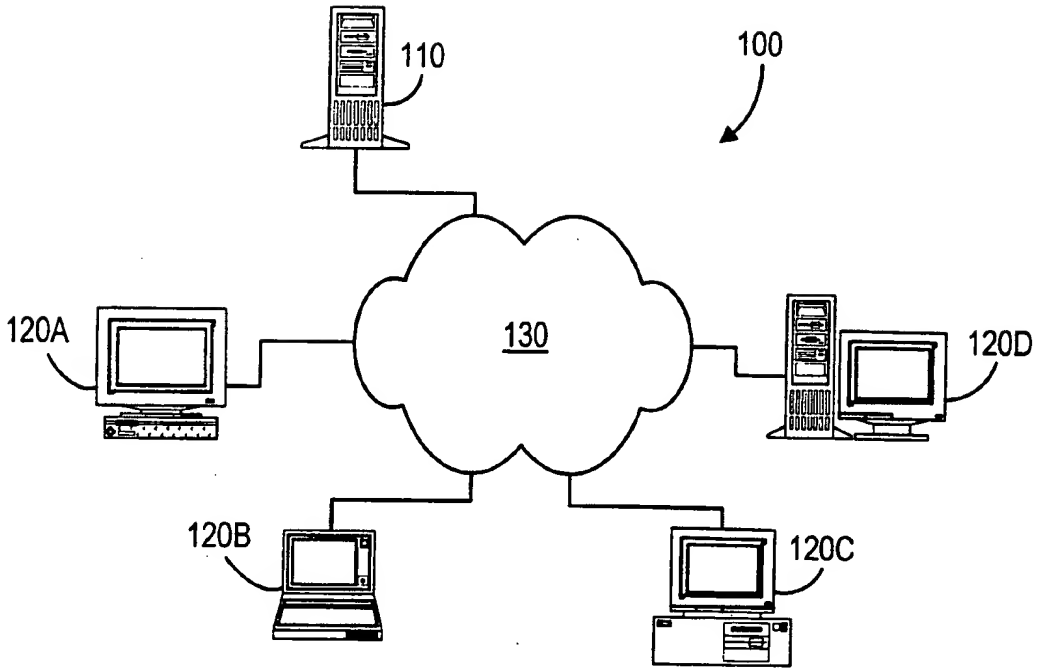


Fig. 1

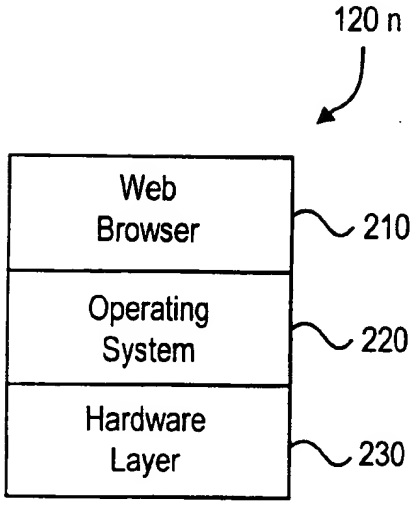


Fig. 2A

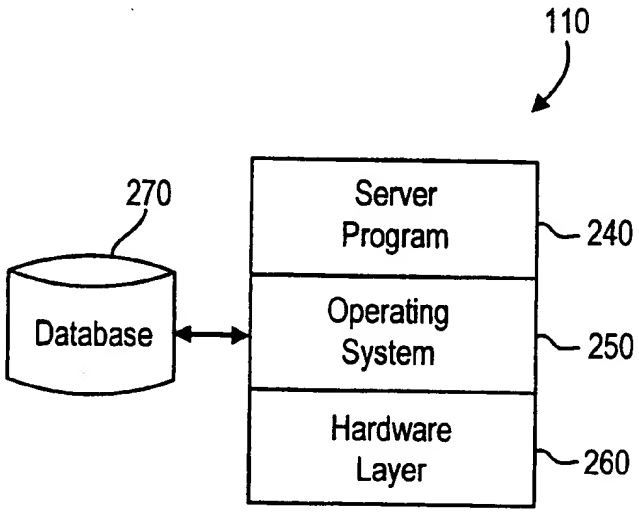


Fig. 2B

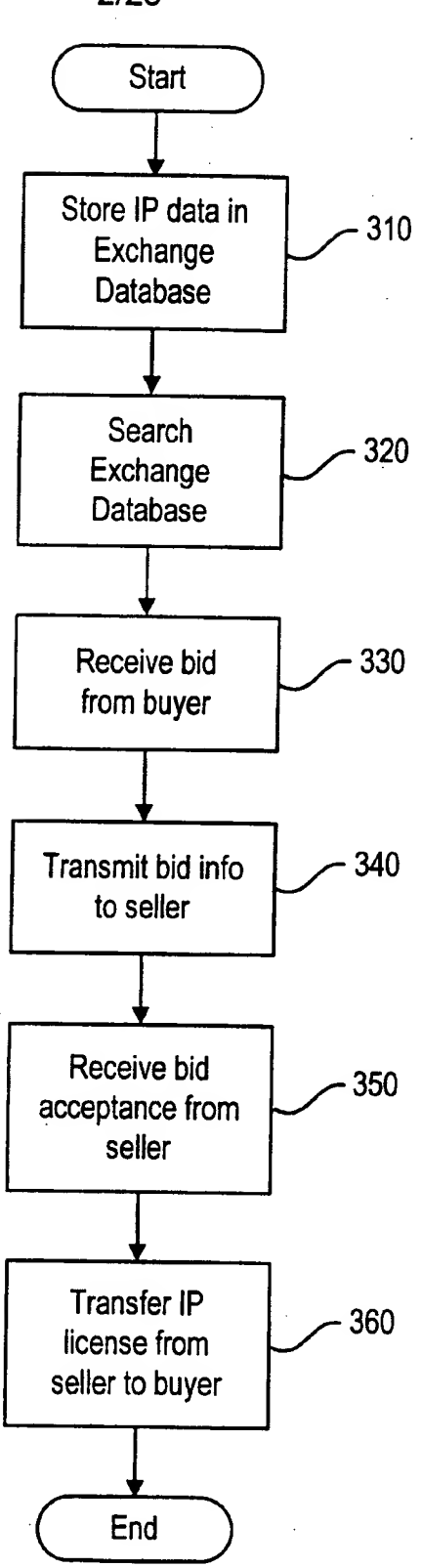
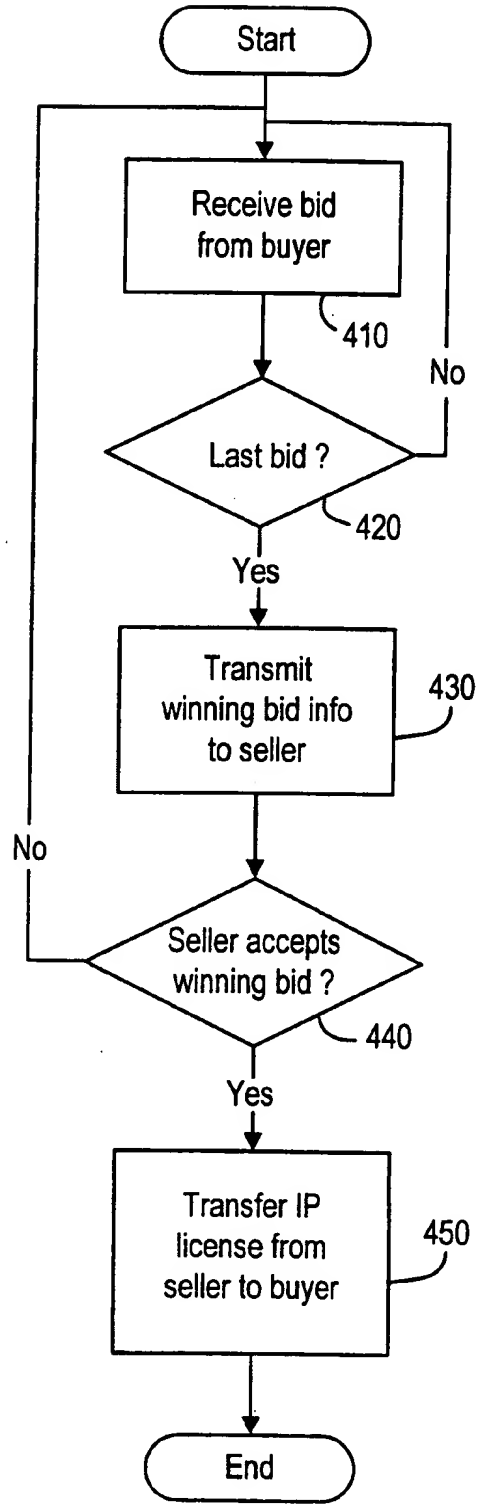

300
Start
Store IP data in Exchange Database
310
Search Exchange Database
320
Receive bid from buyer
330
Transmit bid info to seller
340
Receive bid acceptance from seller
350
Transfer IP license from seller to buyer
360
End

Fig. 3


Start
400
Receive bid from buyer
410
No
Last bid ?
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Transmit winning bid info to seller
430
No
Seller accepts winning bid ?
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Yes
Transfer IP license from seller to buyer
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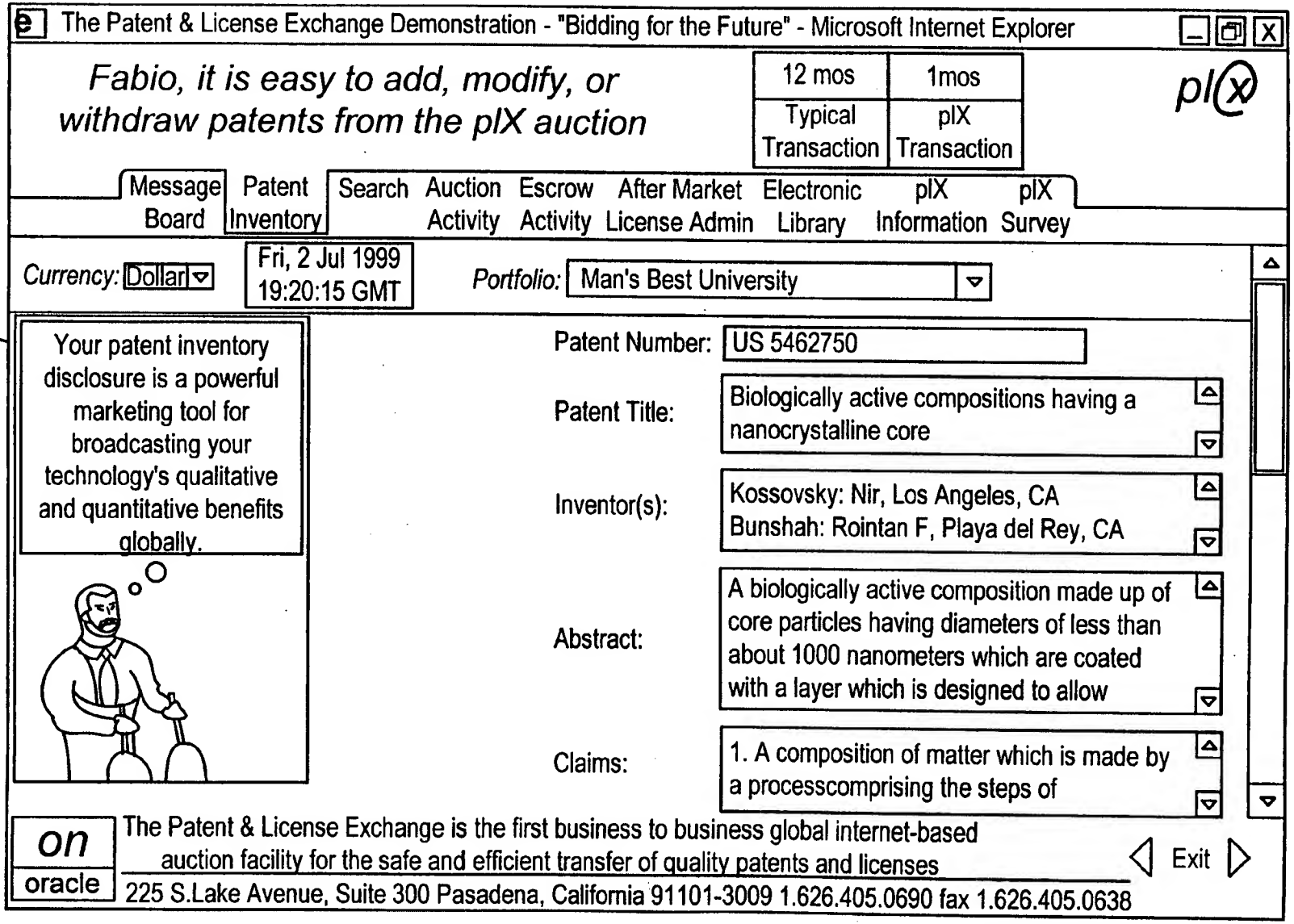
End

Fig. 4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Fabio, it is easy to add, modify, or withdraw patents from the plX auction
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plX Information
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Fri, 2 Jul 1999 19:20:15 GMT
Portfolio: Man's Best University
Your patent inventory disclosure is a powerful marketing tool for broadcasting your technology's qualitative and quantitative benefits globally.
Patent Number: US 5462750
Patent Title: Biologically active compositions having a nanocrystalline core
Inventor(s): Kossovsky: Nir, Los Angeles, CA
Bunshah: Rointan F, Playa del Rey, CA
Abstract: A biologically active composition made up of core particles having diameters of less than about 1000 nanometers which are coated with a layer which is designed to allow
Claims: 1. A composition of matter which is made by a processcomprising the steps of
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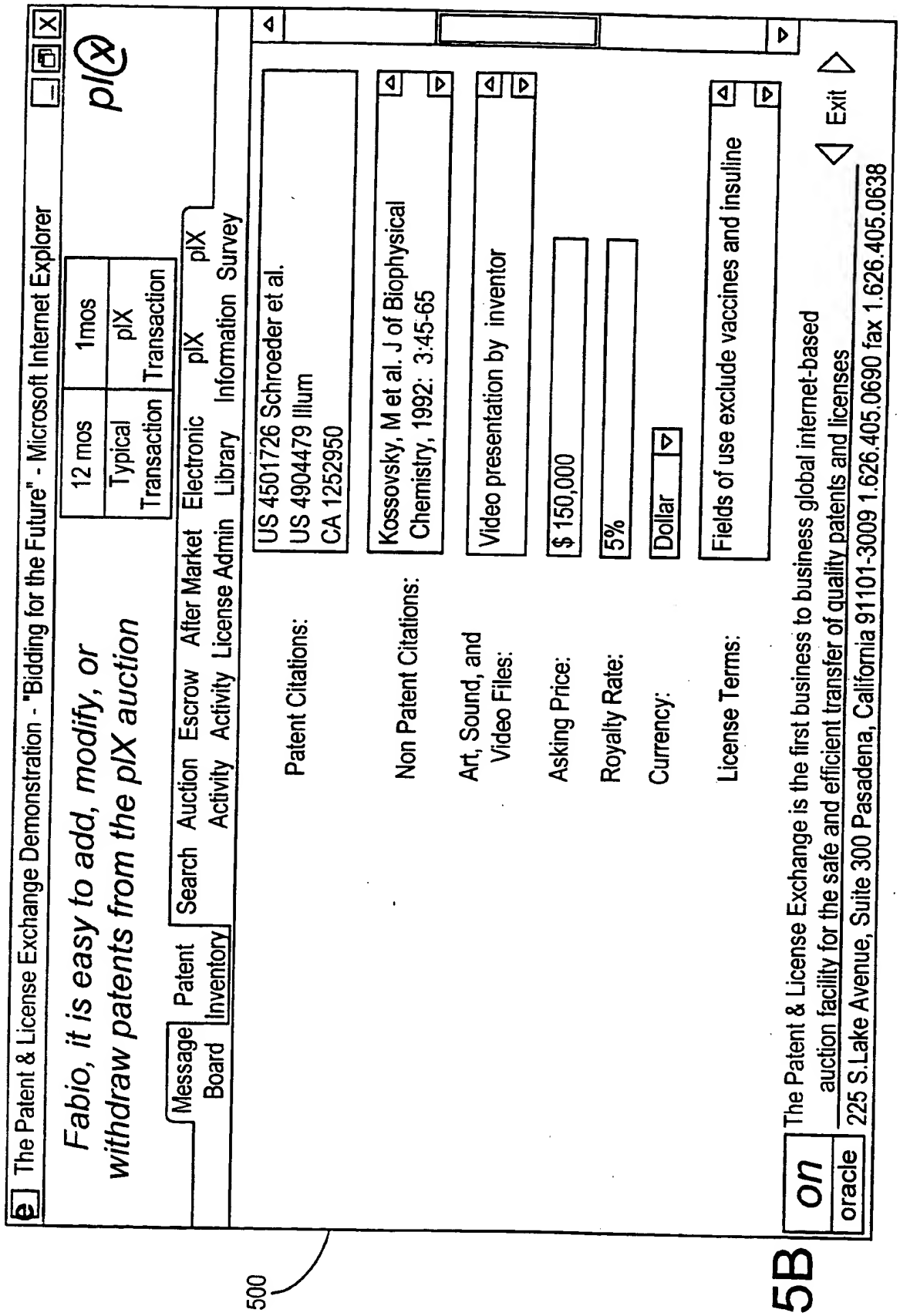
Fig.5A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Escrow Activity
After Market
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plX Information
Survey
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Patent Citations:
US 4501726 Schroeder et al.
US 4904479 Illum
CA 1252950
Non Patent Citations:
Kossovsky, M et al. J of Biophysical Chemistry, 1992: 3:45-65
Art, Sound, and Video Files:
Video presentation by inventor
Asking Price:
$ 150,000
Royalty Rate:
5%
Currency:
Dollar
License Terms:
Fields of use exclude vaccines and insuline
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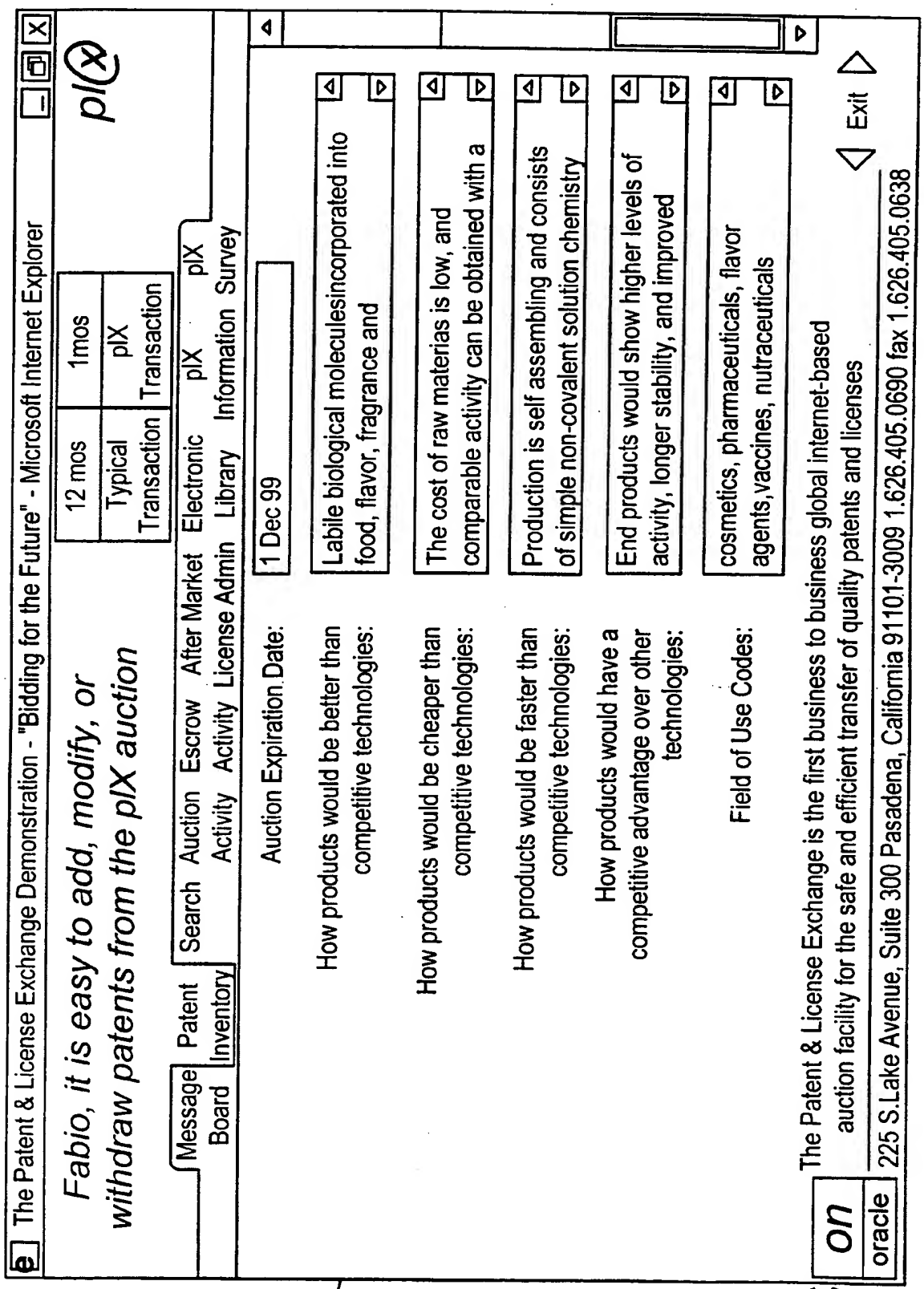
Fig.5B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After Market Activity
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Auction Expiration Date:
1 Dec 99
How products would be better than competitive technologies:
Labile biological moleculesincorporated into food, flavor, fragrance and
How products would be cheaper than competitive technologies:
The cost of raw materias is low, and comparable activity can be obtained with a
How products would be faster than competitive technologies:
Production is self assembling and consists of simple non-covalent solution chemistry
How products would have a competitive advantage over other technologies:
End products would show higher levels of activity, longer stability, and improved
Field of Use Codes:
cosmetics, pharmaceuticals, flavor agents,vaccines, nutraceuticals
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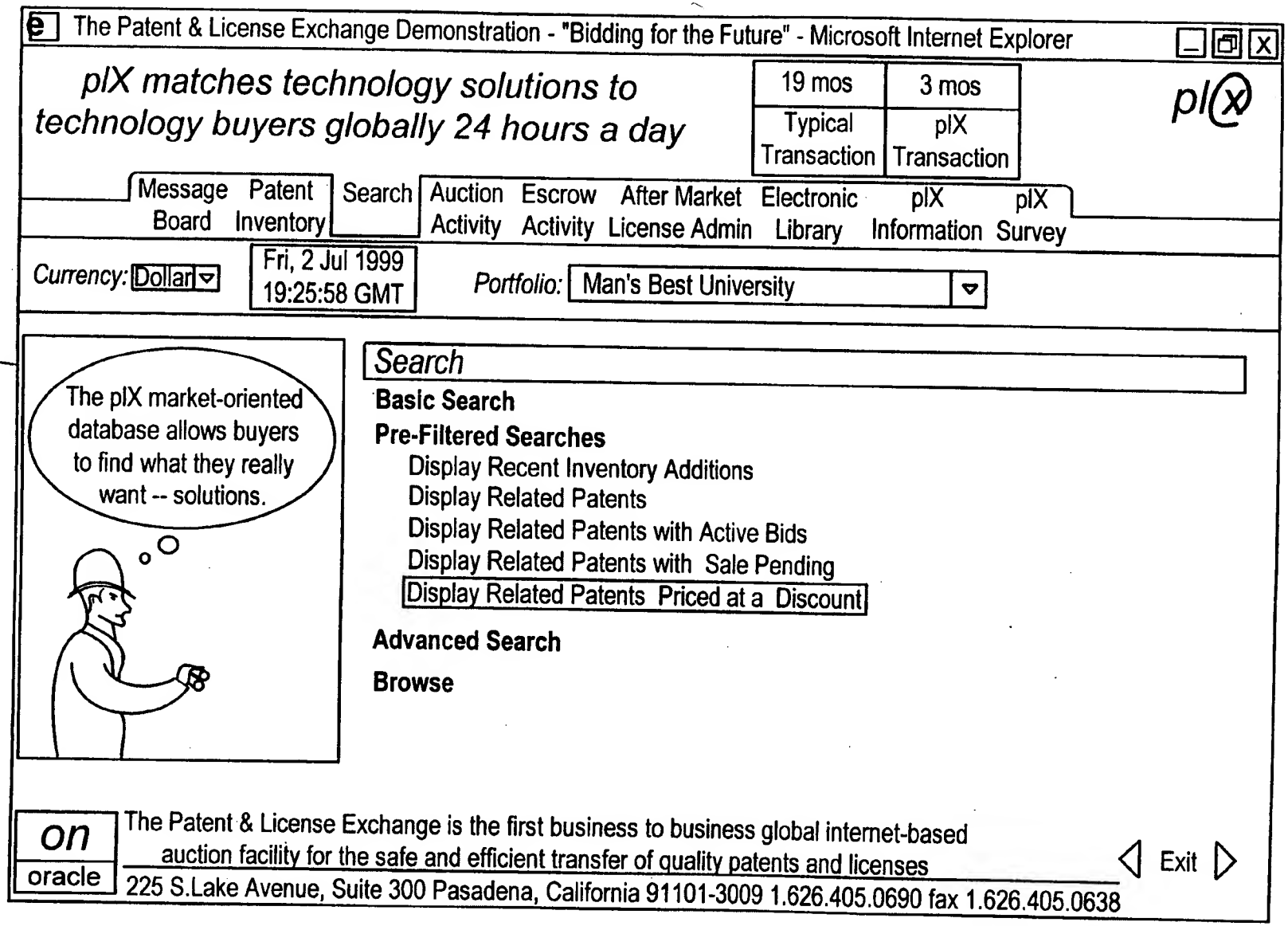
Fig.5C


The Patent & License Exchange Demonstration - "Bidding for the Future" - Microsoft Internet Explorer
plX matches technology solutions to technology buyers globally 24 hours a day
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Typical Transaction
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Patent Inventory
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Escrow Activity
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Currency: Dollar
Fri, 2 Jul 1999 19:25:58 GMT
Portfolio: Man's Best University
The plX market-oriented database allows buyers to find what they really want -- solutions.
Search
Basic Search
Pre-Filtered Searches
Display Recent Inventory Additions
Display Related Patents
Display Related Patents with Active Bids
Display Related Patents with Sale Pending
Display Related Patents Priced at a Discount
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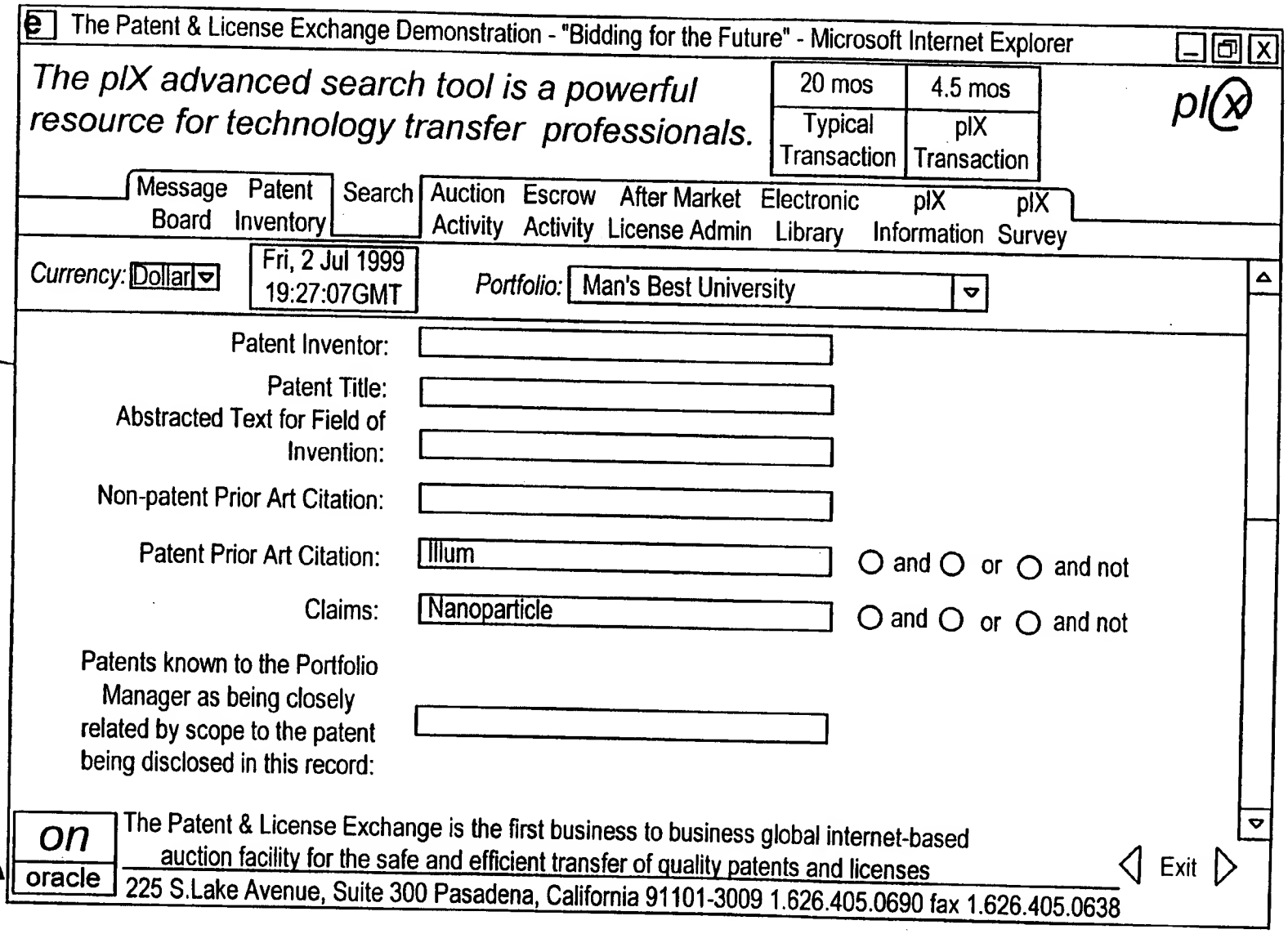
Fig.6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The plX advanced search tool is a powerful resource for technology transfer professionals.
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Auction Activity
Escrow Activity
After Market License Admin
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Currency: Dollar
Fri, 2 Jul 1999 19:27:07GMT
Portfolio: Man's Best University
Patent Inventor:
Patent Title:
Abstracted Text for Field of Invention:
Non-patent Prior Art Citation:
Patent Prior Art Citation:
Illum
and or and not
Claims:
Nanoparticle
and or and not
Patents known to the Portfolio Manager as being closely related by scope to the patent being disclosed in this record:
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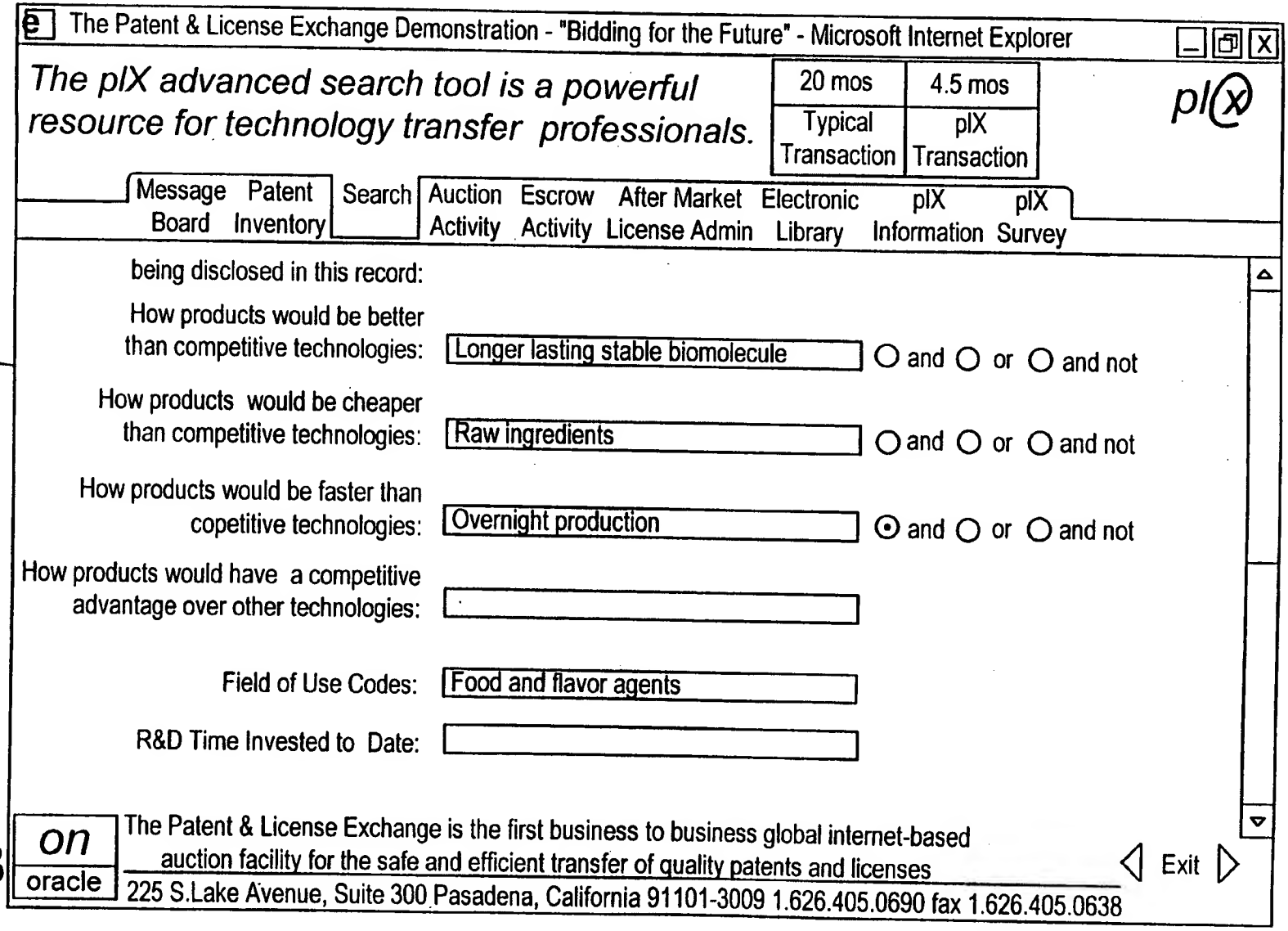
Fig.7A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The Patent & License Exchange Demonstration - "Bidding for the Future" - Microsoft Internet Explorer
The plX advanced search tool is a powerful resource for technology transfer professionals.
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Typical Transaction
4.5 mos
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Message Board
Patent Inventory
Search
Auction Activity
Escrow Activity
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Electronic Library
plX Information
plX Survey
being disclosed in this record:
How products would be better than competitive technologies:
Longer lasting stable biomolecule
and or and not
How products would be cheaper than competitive technologies:
Raw ingredients
and or and not
How products would be faster than copetitive technologies:
Overnight production
and or and not
How products would have a competitive advantage over other technologies:
Field of Use Codes:
Food and flavor agents
R&D Time Invested to Date:
on
oracle
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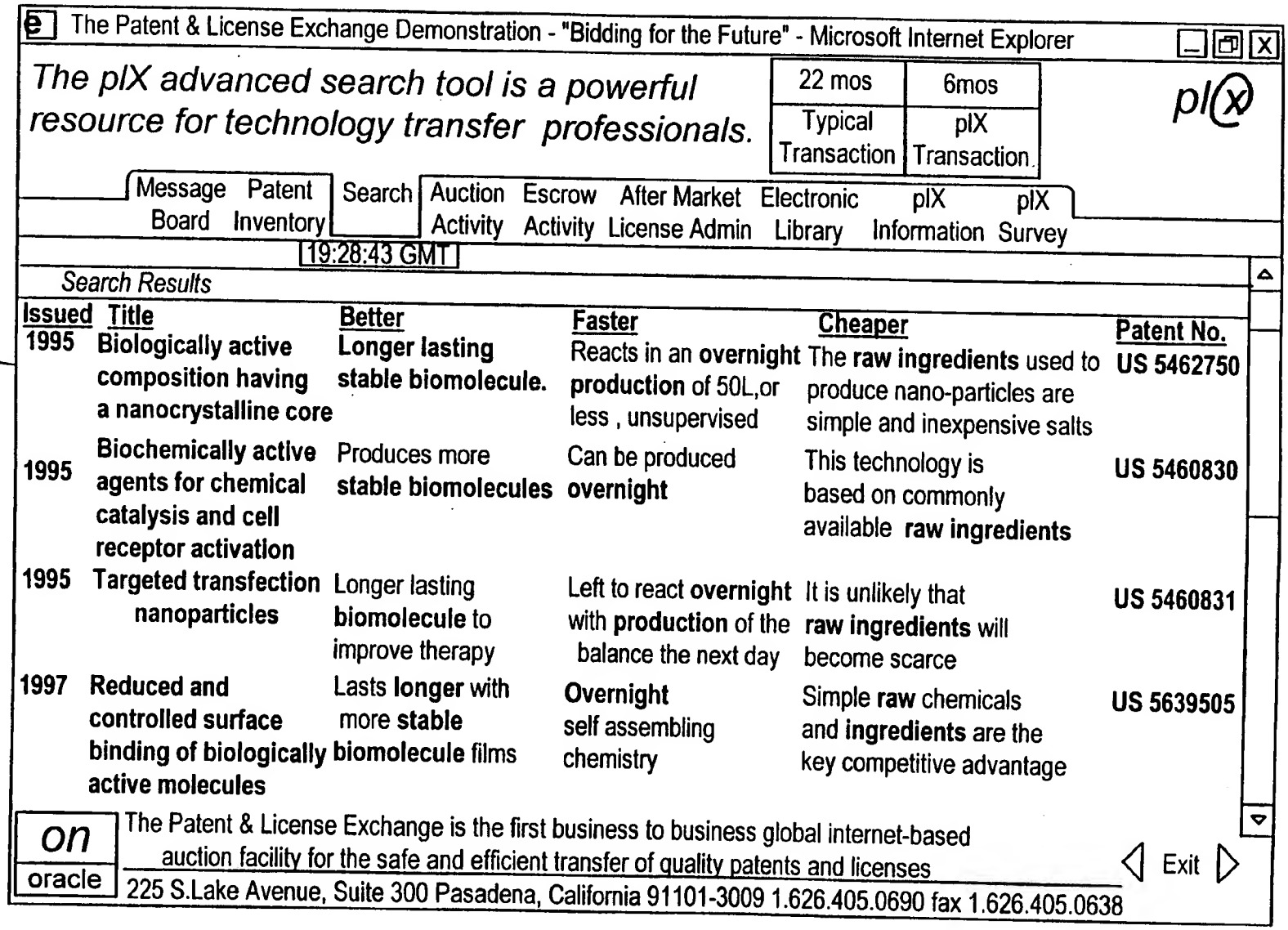
Fig.7B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The plX advanced search tool is a powerful resource for technology transfer professionals.
22 mos
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Patent Inventory
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19:28:43 GMT
800
Search Results
Issued
Title
Better
Faster
Cheaper
Patent No.
1995 Biologically active composition having a nanocrystalline core
Longer lasting stable biomolecule.
Reacts in an overnight production of 50L,or less , unsupervised
The raw ingredients used to produce nano-particles are simple and inexpensive salts
US 5462750
1995 Biochemically active agents for chemical catalysis and cell receptor activation
Produces more stable biomolecules
Can be produced overnight
This technology is based on commonly available raw ingredients
US 5460830
1995 Targeted transfection nanoparticles
Longer lasting biomolecule to improve therapy
Left to react overnight with production of the balance the next day
It is unlikely that raw ingredients will become scarce
US 5460831
1997 Reduced and controlled surface binding of biologically active molecules
Lasts longer with more stable biomolecule films
Overnight self assembling chemistry
Simple raw chemicals and ingredients are the key competitive advantage
US 5639505
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Fig.8

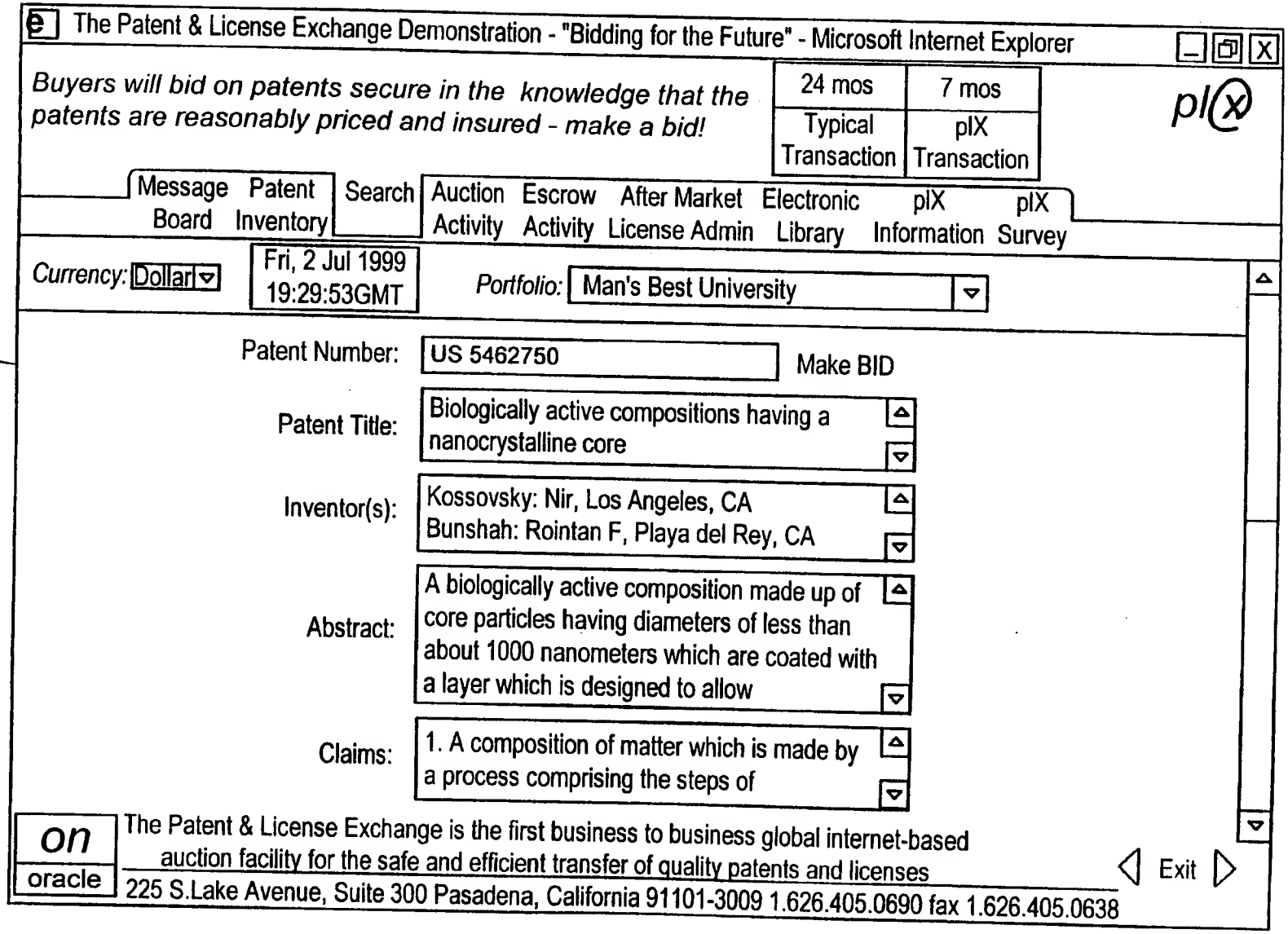
The Patent & License Exchange Demonstration - "Bidding for the Future" - Microsoft Internet Explorer
Buyers will bid on patents secure in the knowledge that the patents are reasonably priced and insured - make a bid!
24 mos
Typical Transaction
7 mos
plX Transaction
plX
Message Board
Patent Inventory
Search
Auction Activity
Escrow Activity
After Market License Admin
Electronic Library
plX Information
plX Survey
900
Currency: Dollar
Fri, 2 Jul 1999 19:29:53GMT
Portfolio: Man's Best University
Patent Number: US 5462750
Make BID
Patent Title: Biologically active compositions having a nanocrystalline core
Inventor(s): Kossovsky: Nir, Los Angeles, CA
Bunshah: Rointan F, Playa del Rey, CA
Abstract: A biologically active composition made up of core particles having diameters of less than about 1000 nanometers which are coated with a layer which is designed to allow
Claims: 1. A composition of matter which is made by a process comprising the steps of
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Fig.9

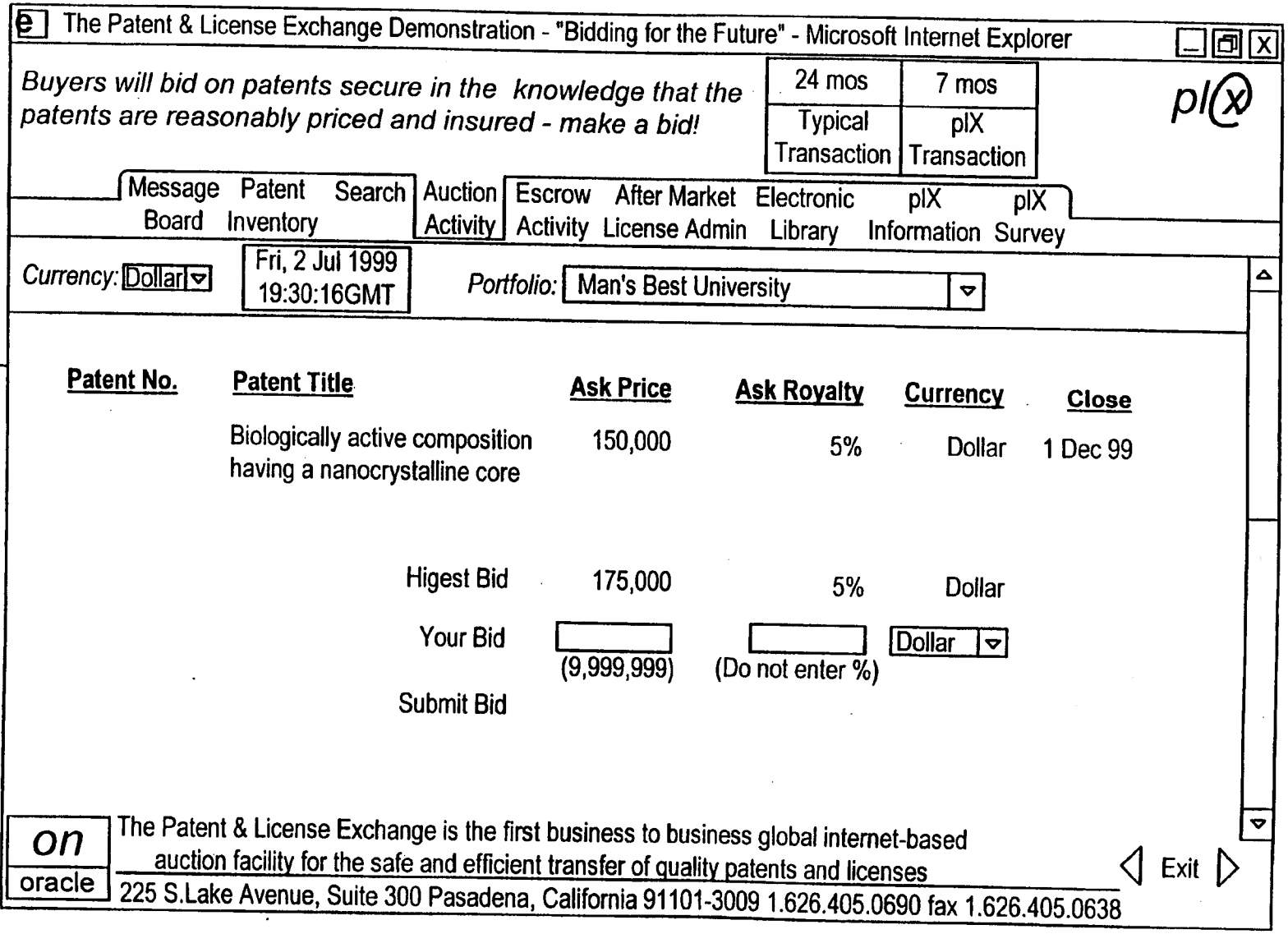
The Patent & License Exchange Demonstration - "Bidding for the Future" - Microsoft Internet Explorer
Buyers will bid on patents secure in the knowledge that the patents are reasonably priced and insured - make a bid!
24 mos
Typical Transaction
7 mos
plX Transaction
plX
Message Board
Patent Inventory
Search
Auction Activity
Escrow Activity
After Market License Admin
Electronic Library
plX Information
plX Survey
1000
Currency: Dollar
Fri, 2 Jul 1999 19:30:16GMT
Portfolio: Man's Best University
Patent No.
Patent Title
Ask Price
Ask Royalty
Currency
Close
Biologically active composition having a nanocrystalline core
150,000
5%
Dollar
1 Dec 99
Higest Bid
175,000
5%
Dollar
Your Bid
(9,999,999)
(Do not enter %)
Dollar
Submit Bid
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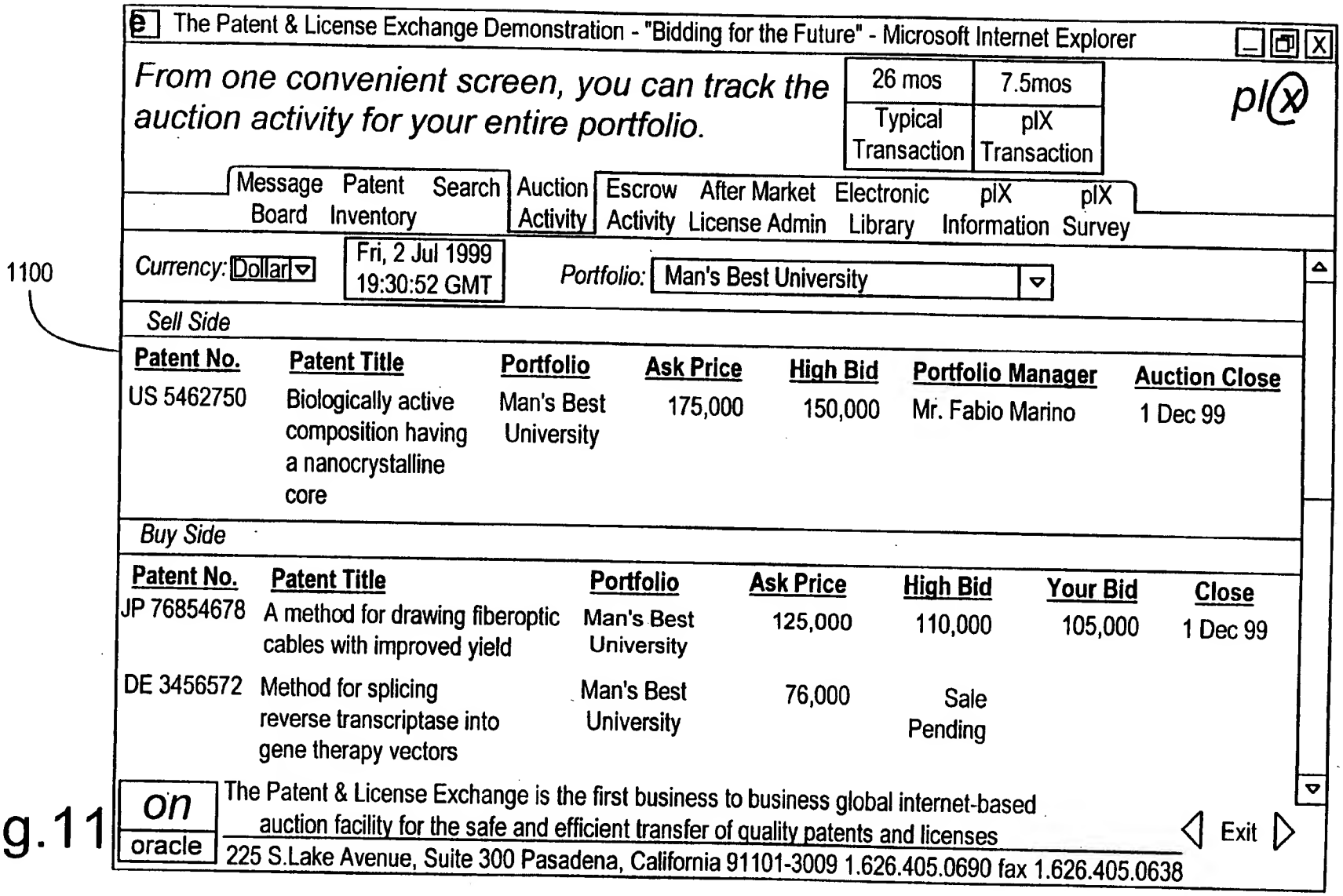
Fig.10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Portfolio: Man's Best University
Sell Side
Patent No. | Patent Title | Portfolio | Ask Price | High Bid | Portfolio Manager | Auction Close
US 5462750 | Biologically active composition having a nanocrystalline core | Man's Best University | 175,000 | 150,000 | Mr. Fabio Marino | 1 Dec 99
Buy Side
Patent No. | Patent Title | Portfolio | Ask Price | High Bid | Your Bid | Close
JP 76854678 | A method for drawing fiberoptic cables with improved yield | Man's Best University | 125,000 | 110,000 | 105,000 | 1 Dec 99
DE 3456572 | Method for splicing reverse transcriptase into gene therapy vectors | Man's Best University | 76,000 | Sale Pending
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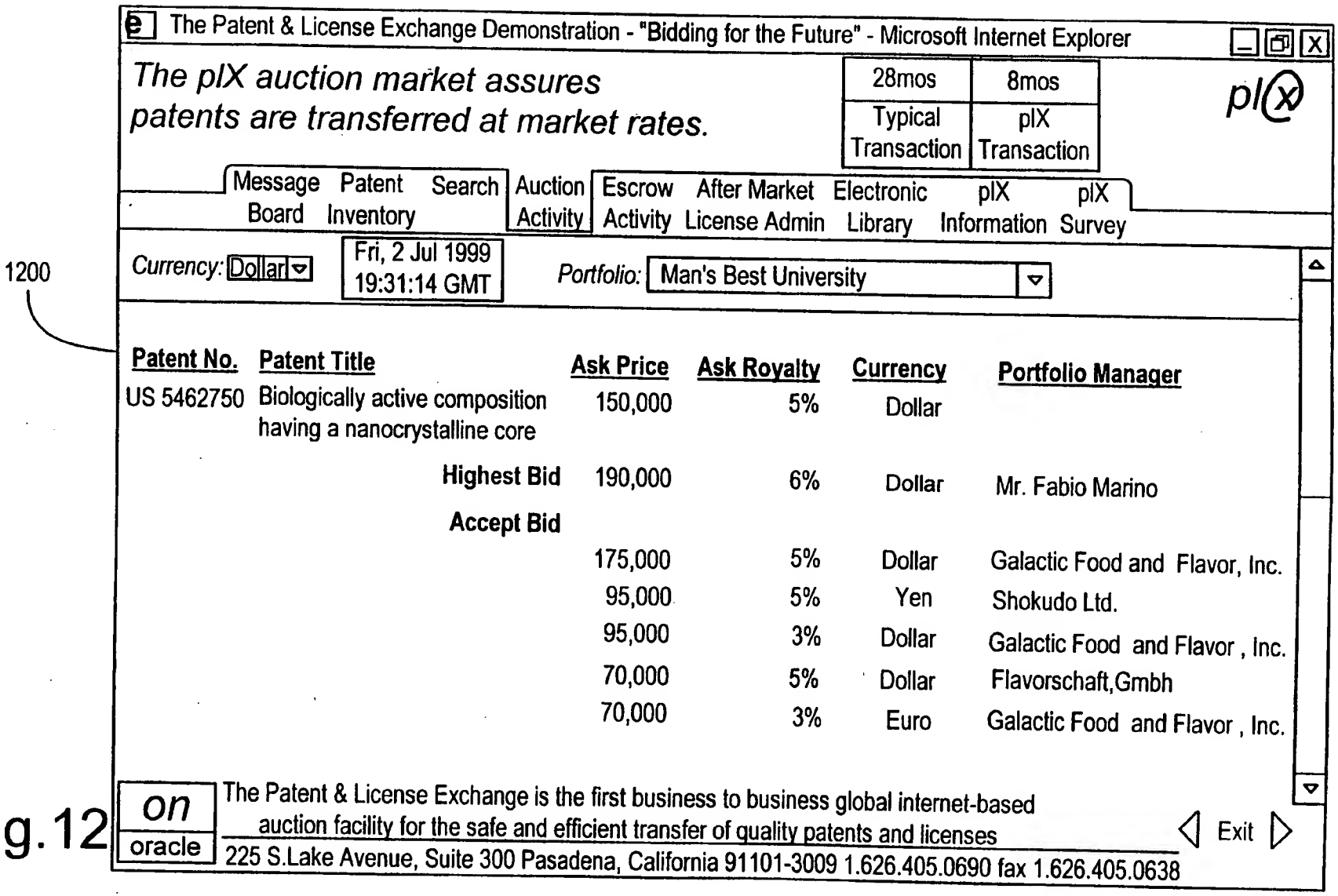
Fig.11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The plX auction market assures patents are transferred at market rates.
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1200
Currency: Dollar
Fri, 2 Jul 1999 19:31:14 GMT
Portfolio: Man's Best University
Patent No.
Patent Title
Ask Price
Ask Royalty
Currency
Portfolio Manager
US 5462750
Biologically active composition having a nanocrystalline core
150,000
5%
Dollar
Highest Bid
190,000
6%
Dollar
Mr. Fabio Marino
Accept Bid
175,000
5%
Dollar
Galactic Food and Flavor, Inc.
95,000
5%
Yen
Shokudo Ltd.
95,000
3%
Dollar
Galactic Food and Flavor , Inc.
70,000
5%
Dollar
Flavorschaft,Gmbh
70,000
3%
Euro
Galactic Food and Flavor , Inc.
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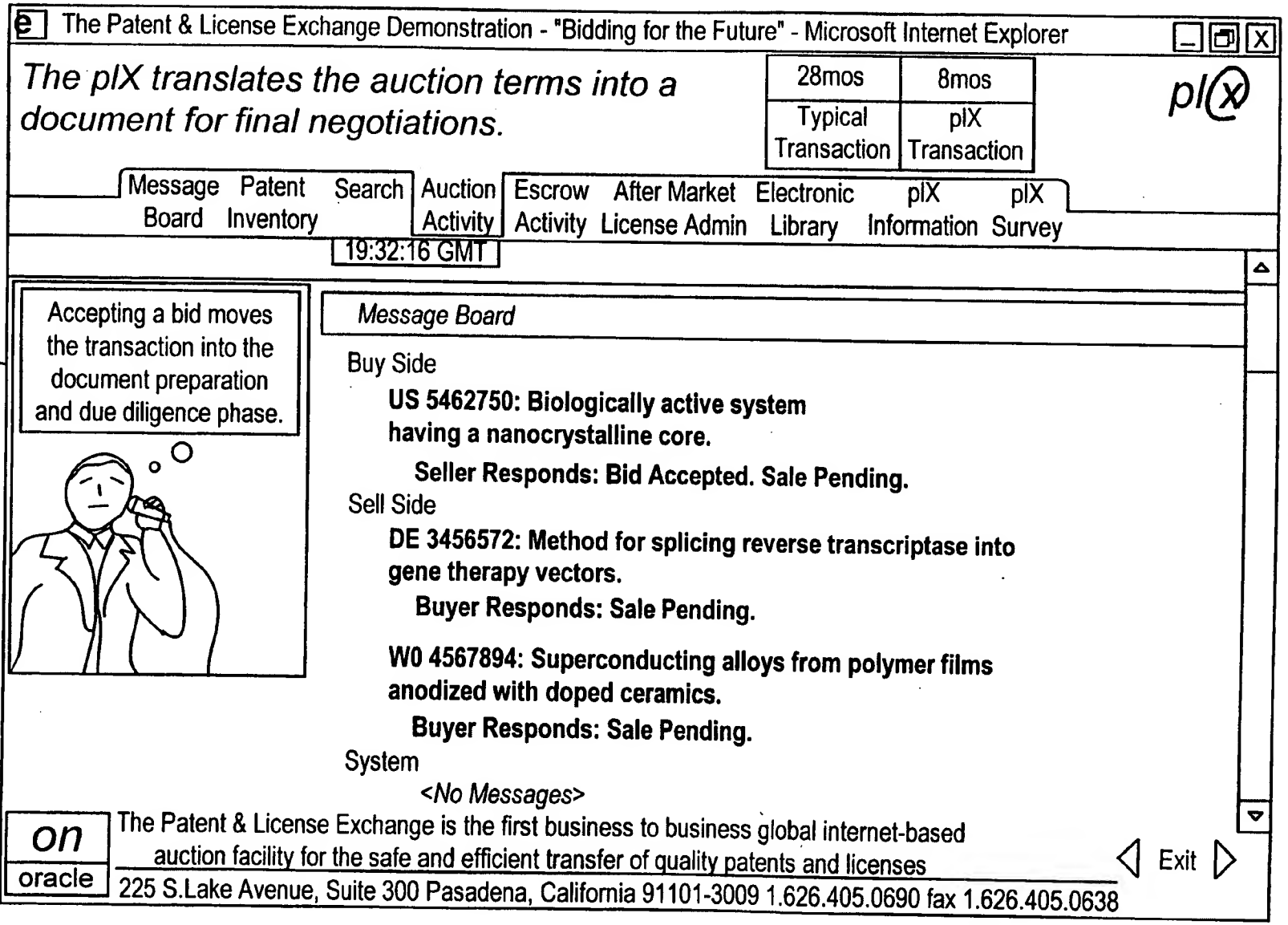
Fig.12


The Patent & License Exchange Demonstration - "Bidding for the Future" - Microsoft Internet Explorer
The plX translates the auction terms into a document for final negotiations.
28mos
Typical Transaction
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plX Transaction
plX
Message Board
Patent Inventory
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Escrow Activity
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plX Survey
19:32:16 GMT
1300
Accepting a bid moves the transaction into the document preparation and due diligence phase.
Message Board
Buy Side
US 5462750: Biologically active system having a nanocrystalline core.
Seller Responds: Bid Accepted. Sale Pending.
Sell Side
DE 3456572: Method for splicing reverse transcriptase into gene therapy vectors.
Buyer Responds: Sale Pending.
W0 4567894: Superconducting alloys from polymer films anodized with doped ceramics.
Buyer Responds: Sale Pending.
System
<No Messages>
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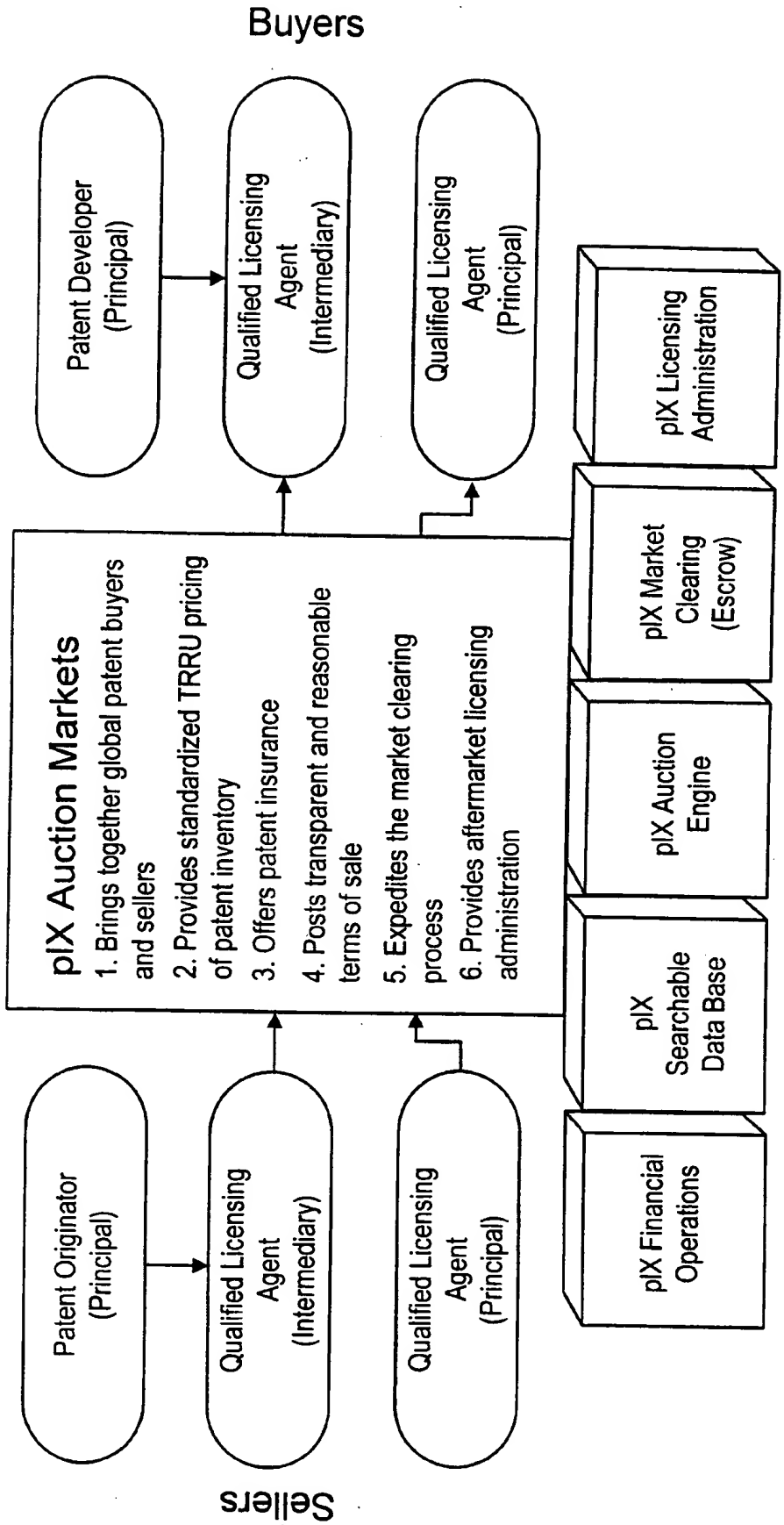
Fig.13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Qualified Licensing Agent (Intermediary)
Qualified Licensing Agent (Principal)
Sellers

Fig. 14

Significance factor guidelines	*Significance*	*Examples*
1.00	"Near-cure" where no therapy existed before	Insulin for insulin-dependent diabetes mellitus, Clotting Factor VIII for Hemophiliacs
0.80	"Near-cure" for a condition for which therapy exists	*Epogen*® from Amgen, Inc. for anemics, which partially replaces transfusions
0.70	Adjunct for a widely accepted existing therapy	*m-PIFF*® from Human Genome Sciences for stem cell preservation
0.50	Clear statistically significant advance over an existing therapy	*Cerezyme*® over *Ceredase*® for Gaucher's disease, both from Genzime
0.10	Equivocal statistical significance, narrowly recommended by FDA panel(s)	*Dermagraft*® from Advanced Tissue Sciences, Inc., *Apligraf*® from Orgarfogenesis, Inc.
0.01	FDA approved with no medical claim	*Clinicel*® from Life Medical Sciences, Inc.

Fig. 15A

Safety factor [B1] guidelines	*Significance*	*Examples*
1.00	No safety concerns	Devices already approved (in a European nation) and in use for years
1.04	Minimal safety concerns	Devices already approved (for alternate applications) and in use for years
1.06	Baseline safety concerns	New endogenous peptide drug
1.10	Moderate safety concerns	New small molecule drug
1.20	Heightened safety concerns	New psychotropic or cardiovascular drug
1.35	Known side effects that *may* be life threatening	Phen-Fen and Heart valve lesions
1.50	Known side effects that *are* life threatening	Radiation chemotherapy
2.00	Patient deaths during clinical trials	

Fig. 15B1

Efficacy factor [B2] guidelines	*Significance*	*Examples*
1.00	Known efficacy	Products already approved (in a European nation) and in use for years with widely documented efficacy. e.g.: *Tisseel* from Baxter
1.03	Negligible efficacy risk	U.S. Phase III trial results complete & compelling. Post-FDA panel approval.
1.07		U.S. Phase III trial results complete & compelling. Pre-FDA panel approval.
1.14	Baseline efficacy risk	New product in an already-established class of products with animal and human efficacy data. Finished Phase II trials, unfinished Phase III.
1.20	Baseline risk + new mechanism risk	New product in a new class of products with animal and human efficacy data. Finished Phase II trials, unfinished Phase III.
1.35	Baseline risk + new mechanism risk + uncertain human reproducibility	New product in a new class of products with animal and human efficacy data. Unfinished Phase II trials.
1.50	Unknown human reproducibility	Promising animal data, human data is anecdotal.
2.00	Unknown efficacy	Equivocal or no animal data.
2.45	Dubious efficacy	Previous Phase III trial run and failed to show statistical significance.

Fig. 15B2

Antelaunch obsolescence factor [C] guidelines	*Competitive environment leading up to launch*
1.00	Product is already launched and selling
1.05	Holds broad composition-of-matter patent. Time until launch appears less than 6 months. No visible competitors
1.10	Patent is broad but may not all-encompassing in its sector.Time until launch appears between 6 and 12 months. No visible competitors.
1.20	Patent is broad but may not all-encompassing in its sector. Time until launch appears between 6 and 12 months. Several visible competitors.
1.35	Use patent rather than composition-of-matter patent. Or, same as above but time until launch appears 12-24 months.
1.55	Use patent, several competitors, time until launch appears 18-30 months.
1.75	Use patent, several competitors, time until launch appears 30-48 months.
2.00	Use patent, several competitors, time until launch appears greater than five years.

Fig. 15C

Post-launch obsolescence factor [D1] guidelines	*Competitive environmental anticipated after launch*
1.00	Product holds domineering composition-of-matter patent for a product in a highly undesirable industry. Undesirability may be from small revenue potential, high start up costs, fierce regulatory environment,etc.
1.05	Product holds domineering composition-of-matter patent. No current visible competitors, but industry is less undesirable so that some may arise. Alternatively, in an undesirable industry with strong, but not domineering, patent breadth.
1.08	As above, but some competitors already exist.
1.20	Holds broad but not all-encompassing patent. Alternatively, as above but industry is more traditional: it may have high start-up costs but is not as undesirable.
1.40	As above but in a more hospitable industry with greater revenue potential.
1.60	Narrower patent, and/or higher profile product and/or more desirable industry with lower barriers to entry.
1.95	Narrow patent for a high-profile product in a highly profitable industry with minimal start-up costs.

Fig. 15D

Basic cost per patient [E1] guidelines	*Trial type*	*Examples*
$2,000	Simple intra-office procedure.	The *Band-It*® syringe pusher from I-Flow Corp.
$3,000	Simple intra-office procedure with a couple follow-up visits required.	*Dermabond*® from Closure Medical for simple skin lacerations.
$4,500	Simple intra-office procedure with 6-9 months of follow-up visits required.	Skin substitutes for chronic wounds from Advanced Tissue Sciences, Organogenesis, and Ortec International.
$6,000	Single inpatient surgery, without lenghty follow-up studies.	Skin substitutes for burn patients from Integra Life Sciences and Genzyme Tissue Repair.
$7,500	Single inpatient surgery with lenghty follow-up studies.	Radiographic tracking of new spinal implants from Sulzer Medica, Sosamor Danek Group, and U.S. Surgical Corp.
$9,000	Multiple inpatient surgeries with very heavy follow-up.	Implantation of left ventricular assist devices from WorldHeart.

Fig. 15E1

Trial center factor [E3] guidelines	*Trial center number requirements*
1.00	Phase III trials may be performed entirely within a single hospital system
1.15	Phase III trials must be spread out and coordinated over 2-10 hospital systems
1.30	Phase III trials must be spread out and coordinated over 10-25 hospital systems

Fig. 15E2

Stature factor [E4] guidelines	*Trial center type required*
1.00	No restrictions - any clinical facility will do.
1.15	High- volume centers are required.
1.40	Particular high-volume centers with particular "thought leaders" in the sector are specified by the FDA.

Fig. 15E3

Non-exclusivity penalty factor [F] guidelines	*Industry in which non-exclusivity is granted*
1.50	No known competitors
2.25	2 major players in the industry (the buyer has one major competitor)
3.15	3 major players in the industry (the buyer has two major competitors)
4.10	4 major players in the industry (the buyer has three major competitors)
5.05	5 major players in the industry (the buyer has four major competitors)
6.00	6 major players in the industry (the buyer has five major competitors)
Factor F = major competitor count for 6 competitors and more	

Fig. 15F

IP rating	*Interpretation*	*Analogous bond rating*
1.00	On-the-market, well-protected product with minimal competition	AAA
1.01 - 1.16	Very low risk product	AA
1.17 - 1.36	Low risk product	A
1.37 - 1.65	Normal product competitive or developmental risks	BBB
1.66 - 2.05	Moderate risk	BB
2.06 - 2.75	High risk	B
2.76 - 4.49	Very high risk	C
4.50 - 20.00	Extreme risk - generally suitable only for large corporation with extensive pipelines	D

Fig. 16